WIRE AND WIRE PRODUCTS

AUGUST 1947

for production wise wire men

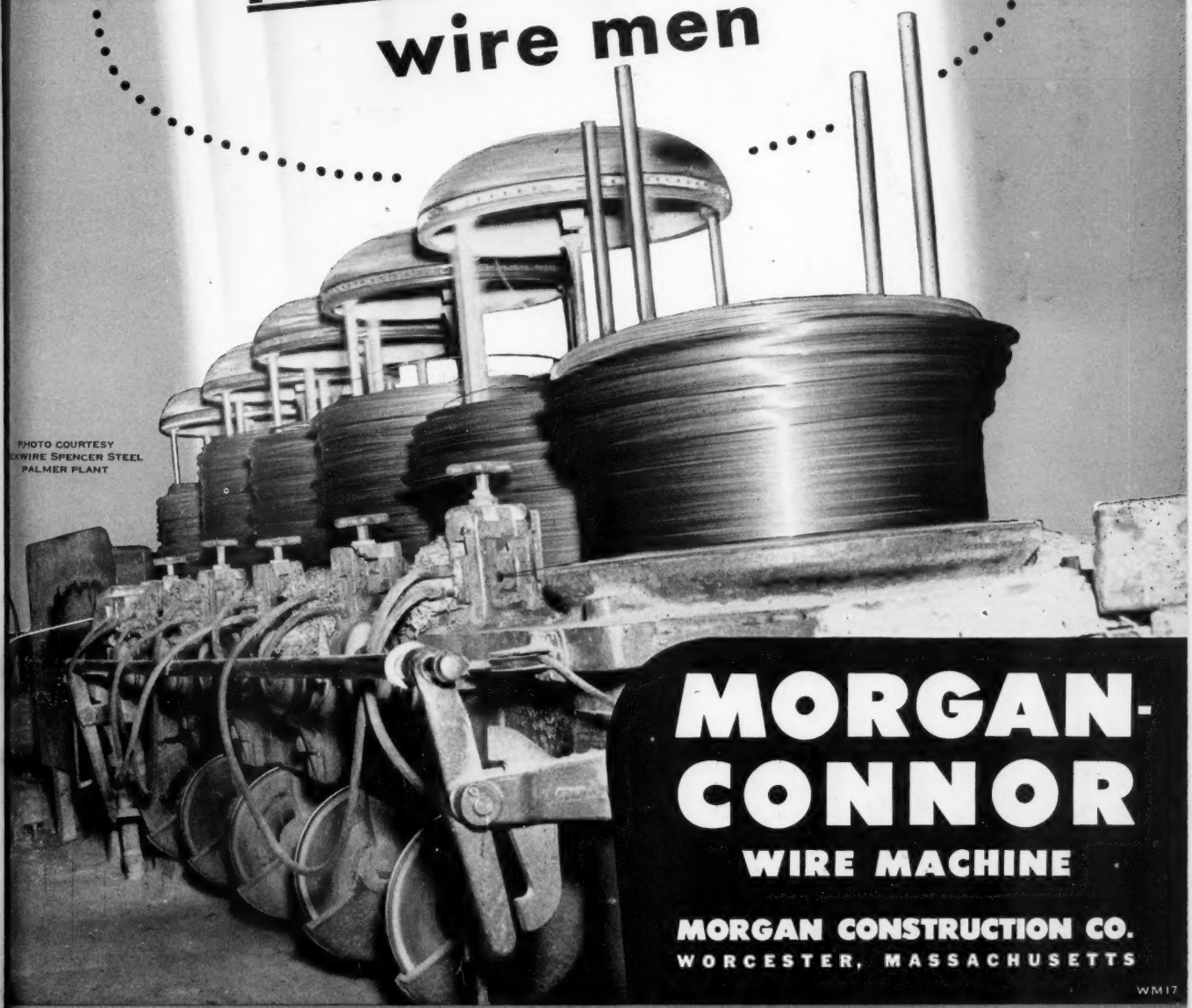

PHOTO COURTESY
WIRE SPENCER STEEL
PALMER PLANT

MORGAN-CONNOR
WIRE MACHINE
MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS
WM17

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

This WILSON BELL TYPE Furnace

SETS A NEW RECORD IN WIRE ANNEALING at WILSON STEEL & WIRE COMPANY

THIS Wilson radiant tube fired wire annealing unit has a base size of 74" diameter and a piling

HEATED with VERTICAL RADIANT TUBES

The Wilson Annealing Unit is covered by Patents Nos. 1,962,402 2,068,477 2,078,105 2,081,612 2,089,804 and other patents pending

Every WILSON

WIRE ANNEALING INSTALLATION IS ENGINEERED TO FIT YOUR SPECIAL NEEDS ★

Bell Type Furnaces Radiant Tube Fired

Rod Coil Spheroidizing

ANNEALING FURNACES for ROD & MERCHANT MILL PRODUCTS

Multi-Stack Furnaces for Rod Coils

Rectangular Bell Type Furnace for Long Straight Bars

Heavy Production Process Wire Annealing

Fine

The WILSON WIRE ANNEALING FURNACE installation at the Palmer, Massachusetts Plant of the Wickwire Spencer Steel Division of The Colorado Fuel and Iron Corp. Now comprises 4 74"x84" Furnaces and 14 Bases.

From 1938 TO 131

WILSON WIRE ANNEALING INSTALLATIONS HAVE BEEN CONTRACTED FOR

1947

Over 100 Tons of Low Carbon Wire are annealed each 24 hours in this department!

Lee Wilson ENGINEERING Co., Inc.
20005 West Lake Road CLEVELAND, OHIO
Telephone ACademy 4670

INDUSTRIAL FURNACES ★
RADIANT TUBE HEATING ★
HEAT TREATING PROCESSES

ATING • HEAT TREATING PROCESSES

ENGINEERED AND CONSTRUCTED BY TH

Lee Wilson ENGINEERING Co., Inc

20005 West Lake Road CLEVELAND, OH

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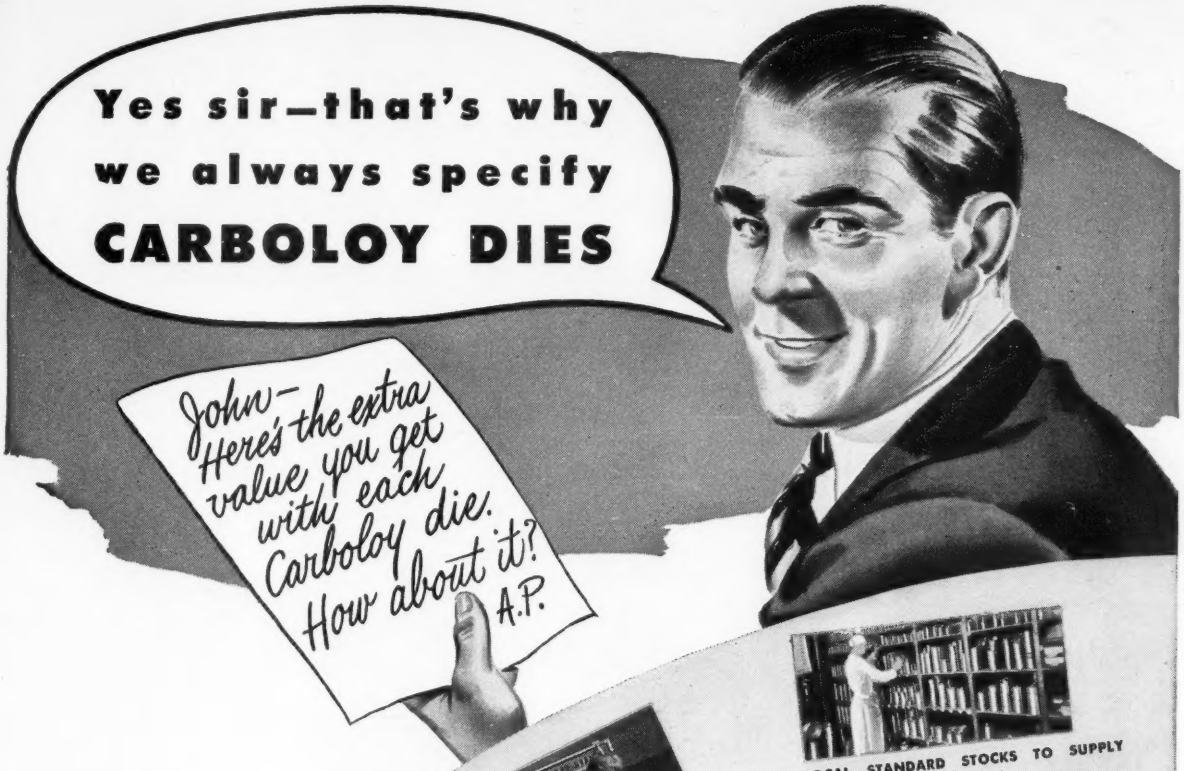
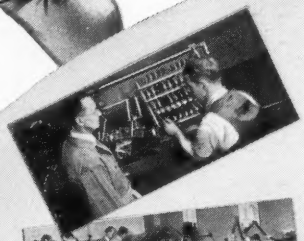
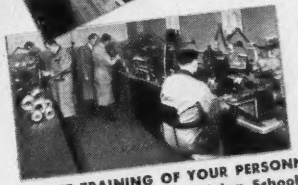
INDUSTRIAL FURNACES ★ RADIANT TUBE HEATING ★ HEAT TREATING PROCESSES

Yes sir—that's why we always specify CARBOLOY DIES



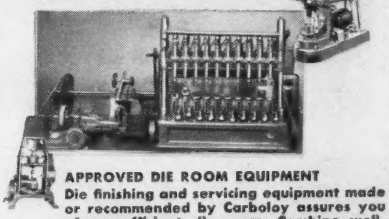
SERVICE CENTERS AND FIELD ENGINEERS
Here's "double help" for you: Completely equipped Die Service Centers (in Detroit, Chicago, Pittsburgh & Thomaston)—AND expert field Engineers—both available to help you in servicing or finishing dies.





FREE TRAINING OF YOUR PERSONNEL
In Carboloy's Die Training School in Detroit, your die room personnel receive thorough training in carbide die application and maintenance methods. Up-to-the-minute training for newcomers or seasoned veterans!

LOCAL STANDARD STOCKS TO SUPPLY YOU PROMPTLY
A great aid to you in maintaining production schedules! Stocked in Detroit, Los Angeles, Pittsburgh, Chicago and Thomaston, Conn.—assuring speedy delivery in metal-working areas coast-to-coast.



APPROVED DIE ROOM EQUIPMENT
Die finishing and servicing equipment made or recommended by Carboloy assures you of an efficient die room. Combine well-trained personnel with high-efficiency equipment and it spells fast die finishing in your mill.

Carboloy offers—at no additional cost—4 important services to help you get the most from your Carboloy investment: Free training for your die-room personnel in Carboloy's Detroit Training School . . . Die Room layout and equipment service . . . Experienced die specialists available locally to furnish expert personal help on all your die problems . . . Local Standard stocks in five important wire drawing areas coast to coast to supply you *promptly*. Die service centers in four key cities. These are the extra values you get when you specify "CARBOLOY". Send today for the comprehensive 64-page Die Service Manual; it's authoritative and free.

Carboloy Company, Inc., 11171 E. Eight Mile Street, Detroit 32, Michigan.

CARBOLOY® CEMENTED CARBIDES

This actual photograph has been enlarged to show the absence of coating failure when bethanized wire is wrapped around its own diameter.

Bethanized wire is the logical choice when the job calls for severe forming. The toughest forming problems are solved with bethanized because its perfectly-bonded zinc coating permits even drawing through dies to fine gauge without damage to the zinc.

The bethanized coating, formed by the electrolytic deposition of pure zinc, is uniform both around and along the wire, has no thin spots to give rust a foothold. And coating weight can be accurately regulated to fit your exact requirements.

A few typical uses of bethanized wire are pump chain, rope wire, spring wire, twisted wire brushes, strand, conveyor belt fabrics, telephone wire, cotter pins, fine-gauge items, and wire forms of many kinds. The complete list of applications is virtually endless. Give bethanized a thorough tryout on your toughest job. You can get complete details from the nearest Bethlehem district office.

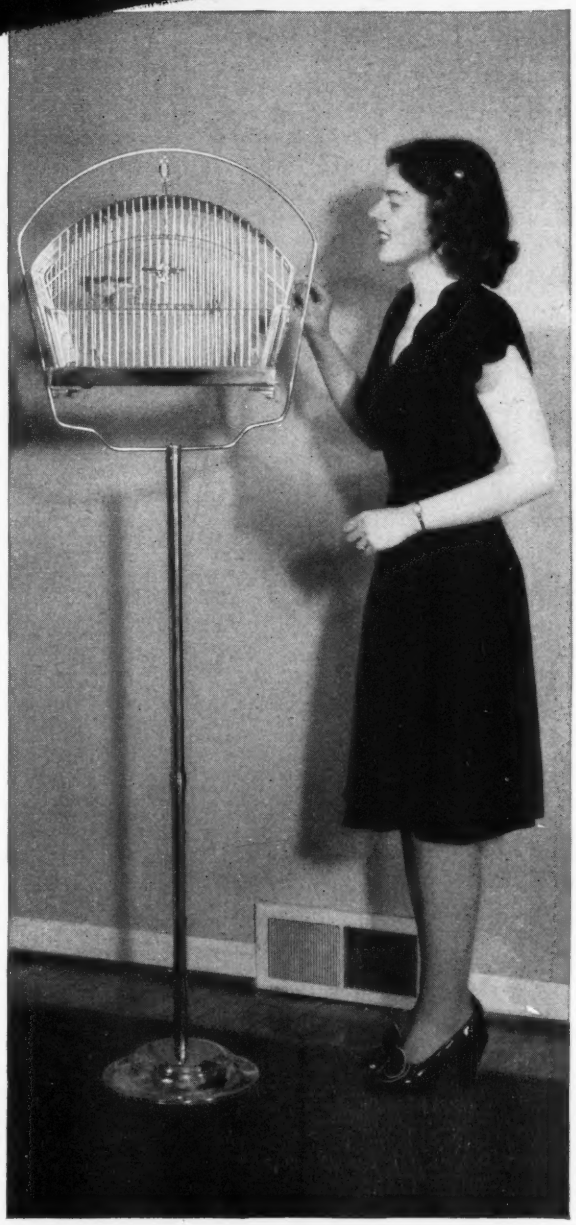
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ Bethanized Wire ★ BETHLEHEM STEEL ★

WIRE & WIRE PRODUCTS, Vol. 22, No. 8, August, 1947. Publication Office, at 61 Cliff St., New York 7, N. Y. Executive Office, 300 Main St., Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secy. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.

Why They Switched to Stainless Steel Wire



"Plating often wears away or chips off—and paint peels."

These are the reasons why a manufacturer changed from plated or painted metals to ARMCO Stainless Steel Wire for his high quality line of bird cages. This "Switch to stainless steel" gives his customers five big advantages:

1. A Neutral Tone . . . Cages blend perfectly with any color scheme.
2. Corrosion Resistance . . . Cages won't rust or become unsightly.
3. High Strength . . . Wire won't bend when the bird attacks with his beak.
4. Easy to Clean . . . Hot, soapy water keeps the cage spic and span.
5. Lustrous Appearance . . . The stainless steel cage and stand retain their attractive bright finish . . . no plating or paint to wear off.

This brilliant lustre is made possible by the easy, low-cost Armco Electropolishing process. After the wires are spot-welded in place, the entire cage is given a high, uniform polish by anodic treatment in a chemical bath.

WRITE FOR DATA

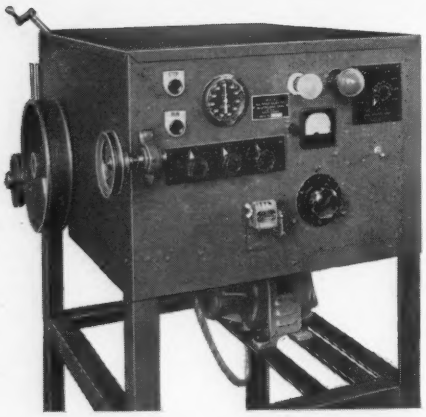
Manufacturers often cut costs and make a good product better by converting from plated metal wire to ARMCO Stainless Steel. Write us for more information if your products are suited to this bright, rustless wire. The Rustless Iron & Steel Division, The American Rolling Mill Company, 3430 E. Chase St., Baltimore 13, Md.

Rustless

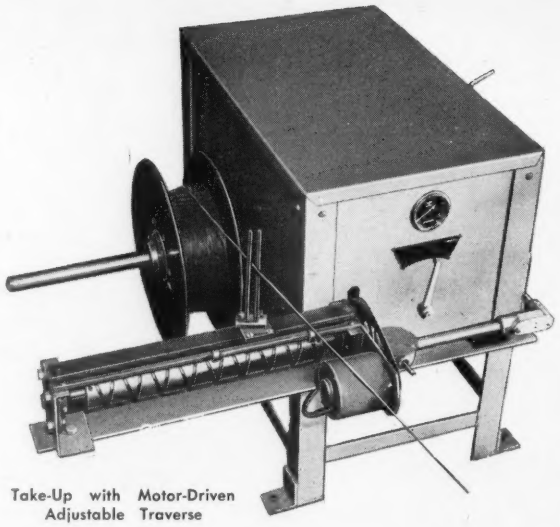
DIVISION OF ARMCO

RUSTLESS IRON & STEEL DIVISION

THE AMERICAN ROLLING MILL COMPANY



Capstan, Spark Tester
and Speed & Tension Control for Take-Up



Take-Up with Motor-Driven
Adjustable Traverse

DAVIS SPARK TESTER AND TAKE-UP

For Thermoplastic Extrusion of Small Wires

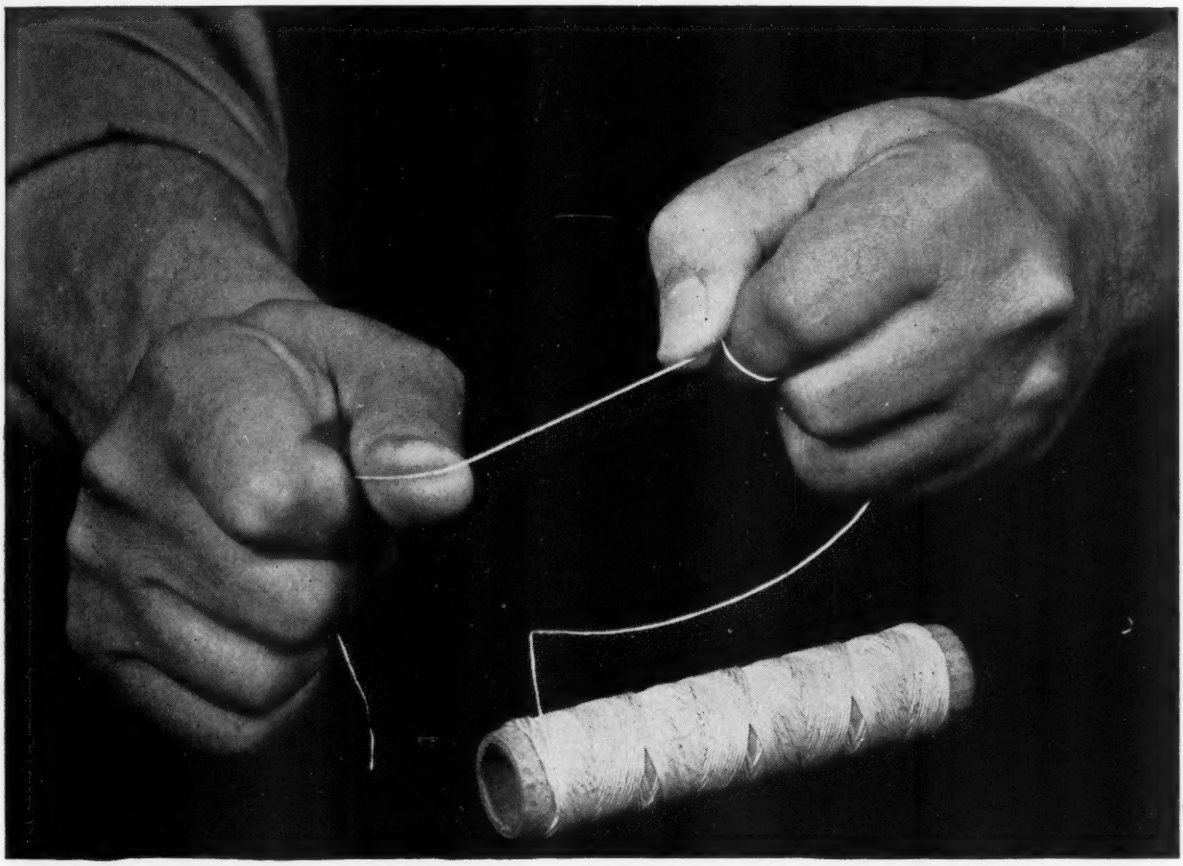
The Capstan and Control Unit embodies the Davis Spark Tester and Tension and Speed Control for take-up. The Take-Up Unit is motor-driven and has an adjustable Traverse.

The Take-Up is governed by the Control Unit, which is contained in the same housing with the Spark Tester and Capstan. The result is an economy of floor space, plus convenient centralization of control for the Spark Tester, Capstan and Take-Up at one point. However, terminals for additional start-and-stop button may also be located at outside points.

DAVIS
EQUIPMENT
FOR THE
WIRE INDUSTRY

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

THE R. L. DAVIS ELECTRIC CO., INC., WALLINGFORD, CONN.



You Get High Strength at Low Cost with *Fiberglas** Tension Cord

If you make, or are planning to make, a product requiring a high-strength tension member, be sure to get the facts about Fiberglas Tension Cord. Because of its exclusive characteristics and economic advantages, it is now being used in the construction of various types of cables and special wires.

The high tensile strength and low stretch characteristics of Fiberglas Cord make it an ideal material even under the severest operating conditions. Where improved handling characteristics, better abrasion resistance or non-slip knotting is desired, Neoprene treatment should be specified. *Try it today.*

There is a type of Fiberglas Cord to meet practically any requirement—for resistors, cable tension member and inorganic filler, lacing cable harnesses, rip cord, or for tying applications in electrical equipment where high strength and long life are important. OCF technicians will be glad to co-operate with you in the selection of the Fiberglas material best suited to your needs and for the development of your new products. For complete information write: Owens-Corning Fiberglas Corporation, Dept. 875, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

* **FIBERGLAS is the trade mark (Reg. U.S. Pat. Off.) of a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.**

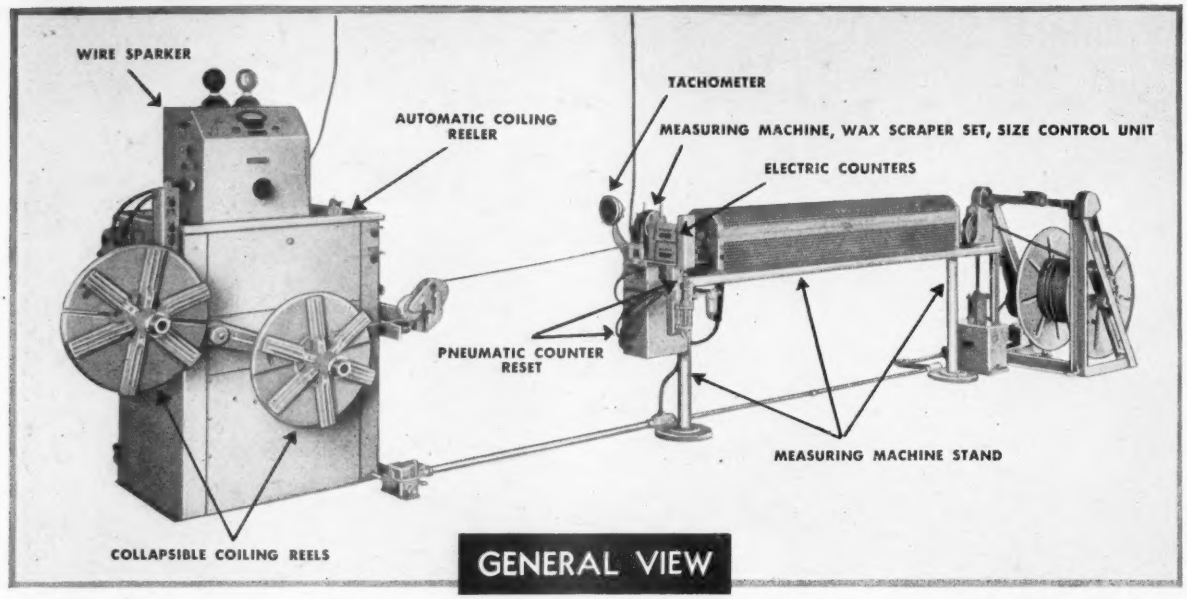
OWENS-CORNING

FIBERGLAS

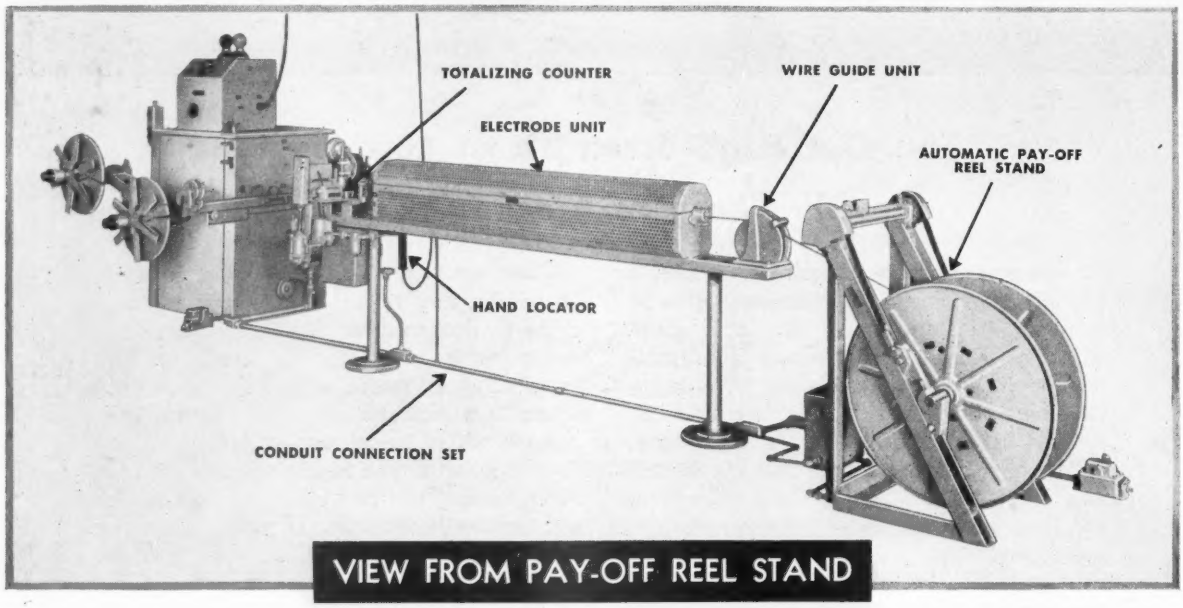
TM. REG. U.S. PAT. OFF.

CORD AND YARN

AUTOMATIC COILING, MEASURING AND SPARK-TESTING EQUIPMENT FOR USE IN COILING FINISHED WIRE



GENERAL VIEW



VIEW FROM PAY-OFF REEL STAND

Quotations on Complete Sets of this Equipment Available on Request.

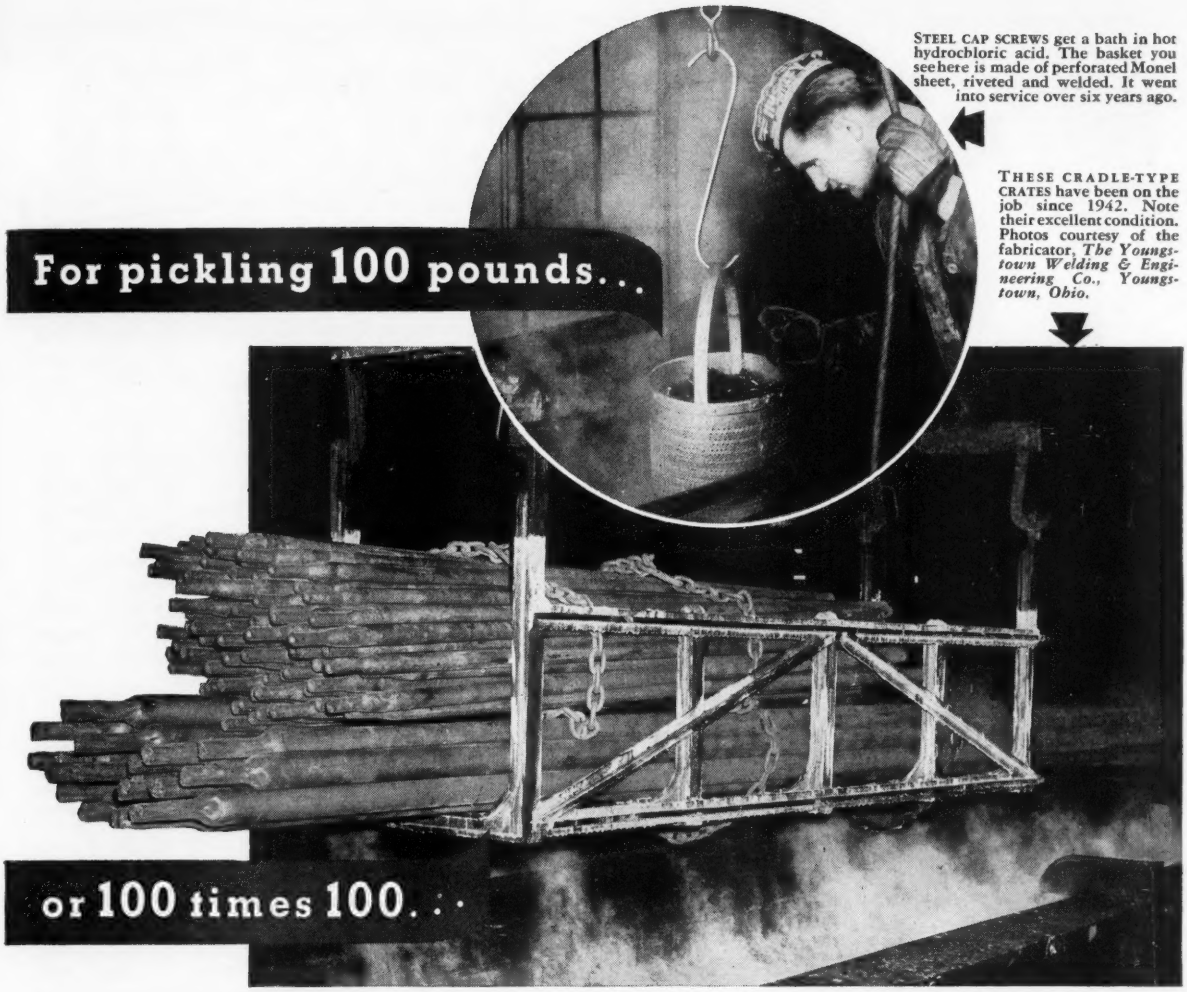
JAMES L. ENTWISTLE CO.

43 CHURCH STREET, PAWTUCKET, RHODE ISLAND

World's Leading Manufacturer of Spark-Testing Equipment

Canadian Representatives:
THE A. R. WILLIAMS MACH. CO., LTD.
64 FRONT ST. W.
TORONTO, ONT.

British Associates:
GENERAL ENGINEERING CO., LTD.,
BURY ROAD, RADCLIFFE,
LANCS., ENGLAND



STEEL CAP SCREWS get a bath in hot hydrochloric acid. The basket you see here is made of perforated Monel sheet, riveted and welded. It went into service over six years ago.

THESE CRADLE-TYPE CRATES have been on the job since 1942. Note their excellent condition. Photos courtesy of the fabricator, *The Youngstown Welding & Engineering Co., Youngstown, Ohio.*

GET THE EXTRA FEATURES OF MONEL

There's no need to pile on ***dead*** weight when you want stronger, longer-lasting baskets or crates.

*Just use Monel**. It has plenty of *extra* strength and toughness. It resists corrosion by sulfuric acid and dilute hydrochloric acid pickling solutions.

With Monel, your equipment doesn't have to be made extra heavy to allow for rapid corrosion. You handle bigger pay loads faster . . . and with *safety*. You save time . . . labor . . . power . . . acid.

You save another way, too. *Even equipment that must be designed for a special job* can be readily fabricated from regular Monel mill forms (rods, bars, angles, etc.) Whatever its form, Monel is readily cut, bent, machined, forged and welded by ordinary methods. Welding doesn't reduce strength, toughness or corrosion resistance.

Remember all these advantages of Monel when a pickling problem has you stumped. Remember also, that experienced fabricators like THE YOUNGSTOWN WELDING & ENGINEERING COMPANY (who made the basket and rack shown above) can offer practical help in design and fabrication.

THE INTERNATIONAL NICKEL COMPANY, INC. *67 Wall Street, New York 5, N. Y.*

EMBLEM OF SERVICE

NICKEL INCO ALLOYS

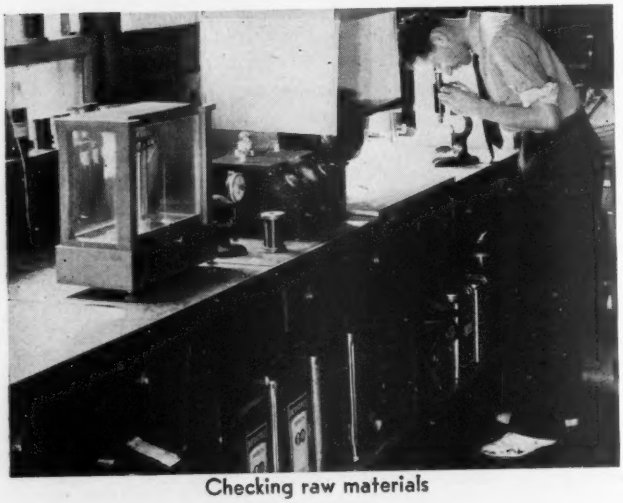
MONEL*

MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • "KR"* MONEL • INCONEL* • NICKEL • "L"* NICKEL • "Z"* NICKEL

*Reg. U. S. Pat. Off.

Custom built spools for high speed winding

Mercury testing for continuity of film



Checking raw materials

Don't "fool around"... USE DEPENDABLE WIRE PRODUCTS!

A product, too, is only as strong as its weakest part. Follow the practice of leading designers and engineers by specifying only service-giving wire . . . wire that has built up a reputation for "delivering the goods under fire."

Hudson Wire products, designed for discriminating manufacturers, has just such a reputation in the fine wire field. Offering greater flexibility and tensile strength, perfect laying at higher speeds, new coating methods and reduced coil dimensions without sacrificing electrical values, Hudson Wire products will probably lower your production costs considerably. Check these three points:

QUALITY — **All phases of manufacture, from ingot to final processing, are carefully supervised and fulfilled in the same manner you would carry out in your own plant. There are no unimportant phases in the work.**

UNIFORMITY — **By mercury process tests, our engineers can guarantee perfect uniformity in wire; from the smallest to the largest order. No more variations in consistency, structure or electrical properties . . . every inch of wire exactly as specified, more than meeting your requirements.**

SERVICE — **If you have a wire problem, our complete design and engineering facilities are at your disposal without obligation. Send your specifications and blueprints for our recommendations; or if you are not quite ready, write for samples of these quality products.**

Enameled Copper, Enameled Iron, Enameled Alloy, Enameled Aluminum, Silk Covered, Cotton Covered, Celanese Covered, Glass Fibre Covered, Twisted Multiples, Parallel Multiples, and Litzendraht

HUDSON WIRE CO.

Winsted Division

WINSTED CONNECTICUT

WHEN YOU ELIMINATE LIMING YOU GET *EXTRA* DIVIDENDS!

WHEN you draw wire without lime, you do away with baking and all its costs. You cut out the mess and dust which make it impossible to keep machines and surroundings clean.

But when you use Magnus Metal Coat #267 instead of lime, you're much more ahead of the game than that!

Your die life will be much longer, particularly at high speeds on continuous machines. You will use much less lubricant. (Savings up to 50% are common). Rejects caused by off-size and scratching will be practically eliminated.

Your worries about hydrogen embrittlement will be ended, since with Metal Coat #267, it is eliminated right in the solution.

As to the finish on your wire – it will be markedly superior, especially on bright, welding, tire bead, rope or any wire for metallic coating or other special finishes. And your customers will greatly appreciate the condition of the wire which makes *their* cleaning operations so much easier.

Remember that although Metal Coat #267 naturally costs more than lime, your overall cost per ton of wire drawn *will be a whole lot less* when you adopt Magnus Metal Coat #267.

We are ready to demonstrate . . . at any time convenient to you.

MAGNUS METAL COAT No. 267

Magnus

CLEANERS • EQUIPMENT • METHODS

MAGNUS CHEMICAL COMPANY • 188 South Avenue, Garwood, N. J.

Service Representatives in Principal Cities

IN CANADA – MAGNUS CHEMICALS, LTD., 4040 RUE MASSON, MONTREAL 36, QUE.

"YOUR PRESENCE IS REQUESTED"

at the ANNUAL CONVENTION of The Wire Association

La Salle Hotel, Chicago, Ill. — October 20-23, (Inclusive)

ALL WIRE MEN ARE CORDIALLY INVITED TO ATTEND

REGISTRATION FEE: $5.00

The program will cover:

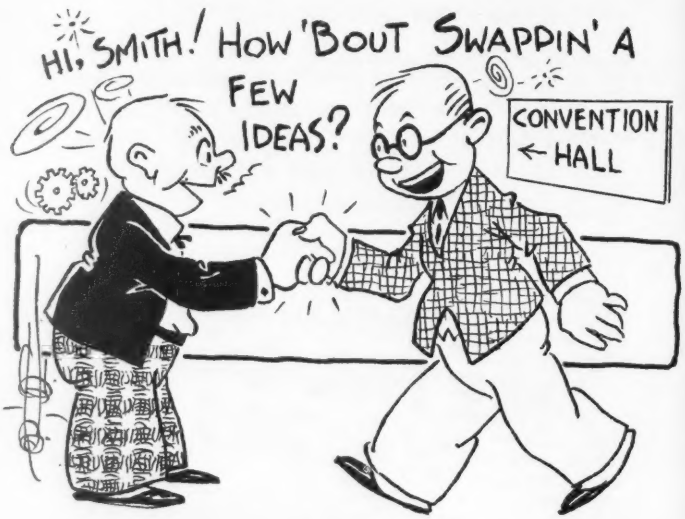
TECHNICAL SESSIONS

Wire Processing
- — Drawing
- — Cleaning
- — Heat-treating

Materials
- — Drawing High Carbon Steel Wire
- — Drawing Aluminum Alloys
- — Fabrication of Tungsten Wire

SYMPOSIA

- Present Status of the Wire Industry in the U. S.
- World-wide Wire Industry Conditions
- Outlook and Trend in the Wire Industry
- Recent Developments in the Wire Industry



Come, get acquainted, renew old friendships, make new ones, give, take, learn. Above all, BE THERE!

PLANT INSPECTIONS

Ferrous — Republic Steel Corp., So. Chicago Works
Non-ferrous — Western Electric, Hawthorne Works

OTHER ACTIVITIES

The Annual Wire Association Luncheon
The Annual Smoker Dinner

R.S.V.P. Write today, giving your hotel requirements to

RICHARD E. BROWN, EXECUTIVE SECRETARY

THE WIRE ASSOCIATION

300 MAIN STREET **STAMFORD, CONN.**

YOU CAN GET IT NOW!

Alcoa Aluminum Wire

FOR NAILS AND RIVETS

Check these advantages of ALUMINUM

★ **THREE FOR ONE**
. . . three times as many feet of wire in a pound of aluminum as in a pound of brass, copper, bronze, or steel.

★ **LOWER COST**
. . . costs less per piece than copper, brass, bronze, or stainless steel.

★ **CORROSION RESISTANCE**
. . . aluminum cannot rust or stain. Needs no painting or protective coating.

★ **EASY TO WORK**
. . . all the aluminum alloys can be headed on your present machines.

★ **ATTRACTIVE APPEARANCE**
. . . use aluminum in its attractive natural color. Or give it any color of the rainbow by the patented Alumilite or Alrok processes.

You can get *prompt shipment* from Alcoa of aluminum wire in standard alloys, gages, and tempers for nails, rivets, and other header-machine products.

Telephone your near-by Alcoa sales office today. ALUMINUM COMPANY OF AMERICA, 1828 Gulf Building, Pittsburgh 19, Pa. Sales offices in 55 leading cities.

MORE PEOPLE WANT **MORE** ALUMINUM FOR **MORE** USES THAN EVER

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

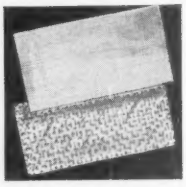
3 TAPE QUESTIONS

HOW MANY CAN YOU ANSWER?

General Electric spares no expense or effort to produce the finest cable tape obtainable. Each step in the intricate production is carefully supervised. The G.E. laboratories do your experimenting for you, and they make certain that the tape you use is the best tape for the job. General Electric emphasizes quality control. This is your assurance that all G-E cable tape is uniform and conforms to specifications. For further details write to Resin and Insulation Materials Division, Chemical Department, General Electric, Schenectady 5, N. Y.

CABLE TAPE

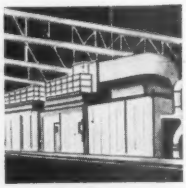
QUESTION NO. 1: How does sizing affect a cable tape's insulating qualities?



ANSWER

It affects it greatly. Too much sizing means less varnish impregnation—and it is the varnish that insulates, not the sizing. The cloth used in G-E cable tape contains just the right amount of sizing to permit maximum varnish impregnation.

QUESTION NO. 2: What advantages are there in pre-testing cable tape:



ANSWER

Pre-testing brings to light any flaws in the cloth itself. Mechanical and dielectric strength can be accurately determined before the tape is used, and resistance to chemicals and moisture can be established to help guarantee long and efficient service life. Each lot of G-E tape is carefully pre-tested to make certain that it has all the important insulating values.

QUESTION NO. 3: How does a tape affect your cable business?

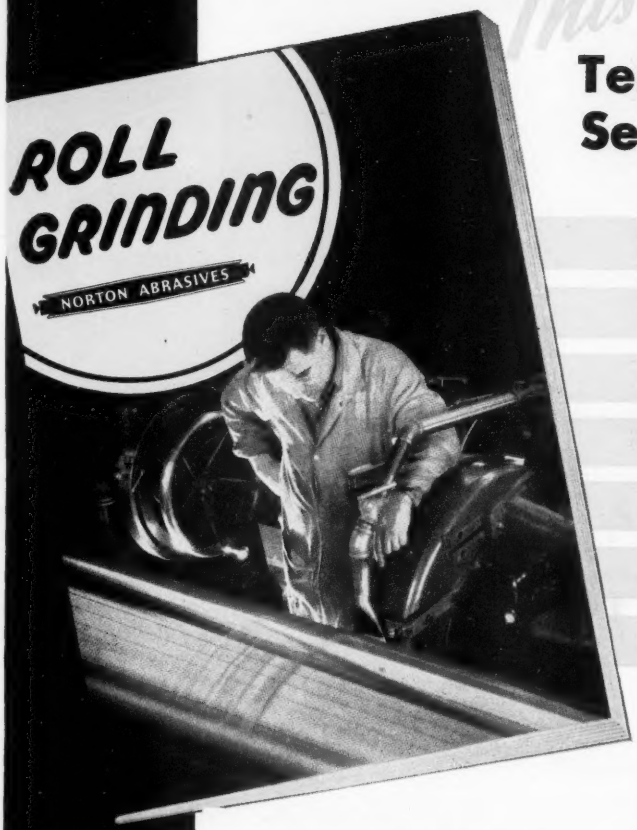
ANSWER

Naturally a good tape helps insure a high quality cable. G-E cable tape more than meets I. P. C. E. A. standards. It is extremely easy to apply because it is soft, pliable, and of uniform width and thickness.

GENERAL ELECTRIC

CD47-T6

WHAT KIND OF ROLLS ARE YOU GRINDING?



This New Booklet

Tells You How To Select Wheels *for*

HOT MILL ROLLS
COLD MILL ROLLS
STECKEL MILL ROLLS
TINNING ROLLS
PAPER MILL ROLLS
JEWELERS' ROLLS
COPPER ROLLS

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IF you are grinding any rolls in your plant you'll surely want a copy of this booklet. It's completely new from cover to cover—over 50 pages of practical information on the selection and use of wheels for grinding all kinds of rolls. Mail the coupon today for your copy—there's no charge nor obligation.

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Please send a copy of your new book "ROLL GRINDING".

Name .....
Title .....
Firm .....
Address .....

W-1071

BRAIDERS FOR WIRE INSULATION

SIZE B-11

40%

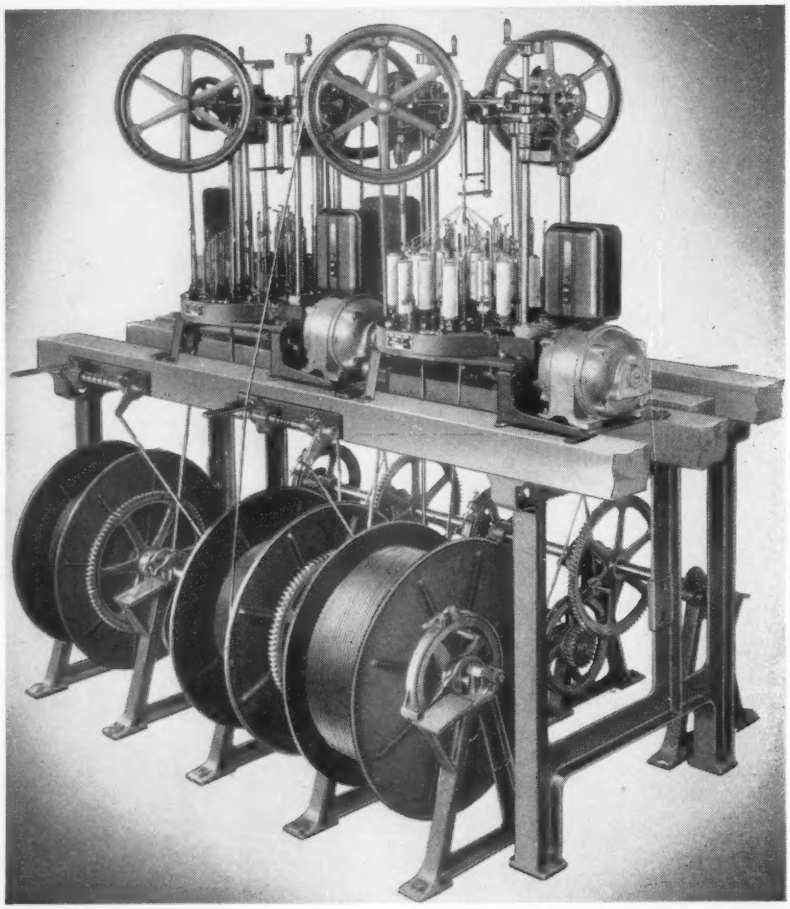
INCREASE IN

YARN

CAPACITY

OVER

B-2 SIZE



INCREASED

OPERATING

EFFICIENCY

LOW

MAINTENANCE

B-11 BRAIDERS, equipped with high speed spring tension carriers and thick plates, provide the economical means of covering wire.

Whether your problem be that of a single braid covering or a triple covering for weatherproof wire, the B-11 BUTT BRAIDER will prove to be the most efficient solution.

WRITE FOR DETAILED DESCRIPTION

NEW ENGLAND BUTT COMPANY

ESTABLISHED 1842

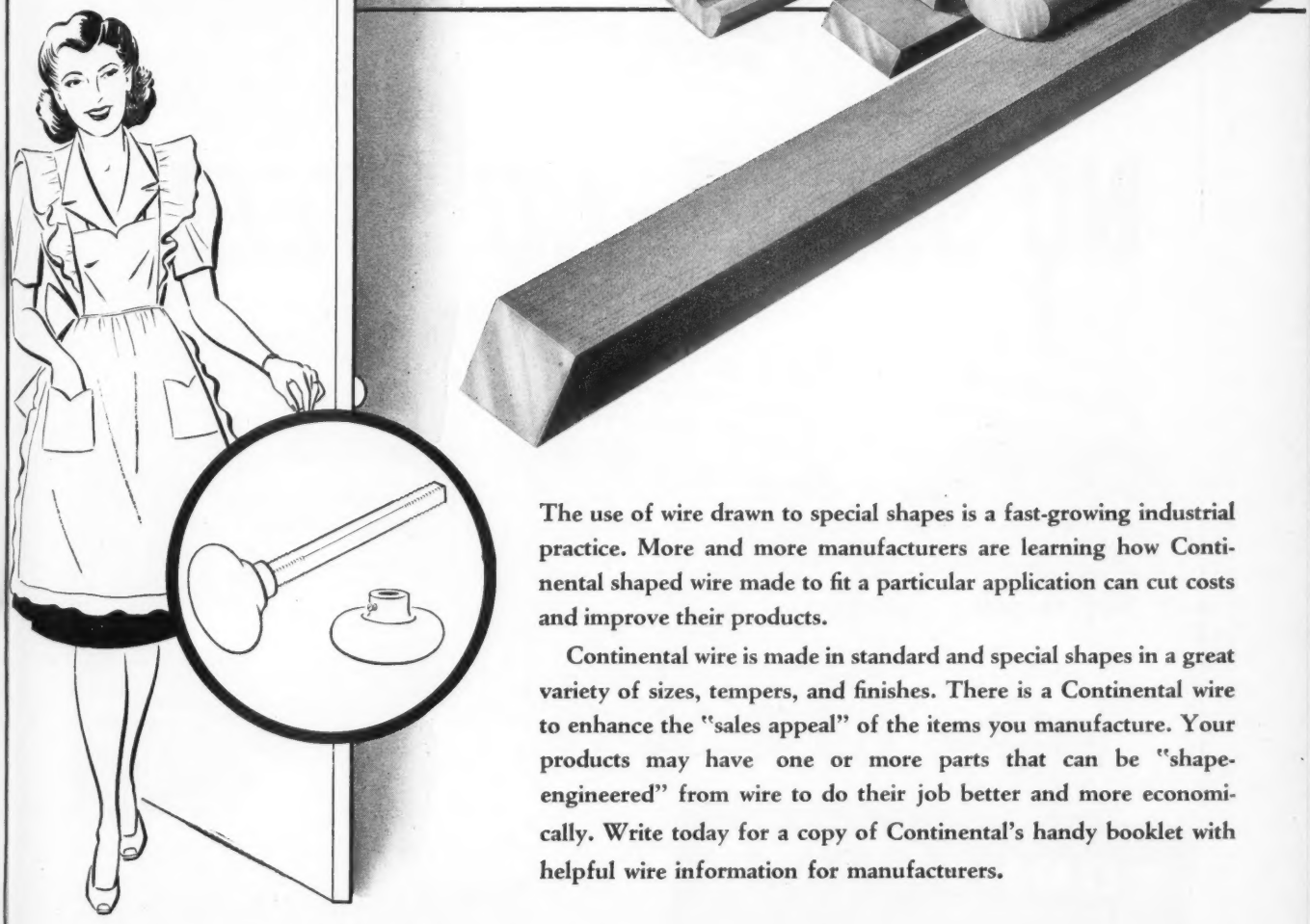
304 PEARL STREET

PROVIDENCE 7, RHODE ISLAND, U. S. A.

JAMES DAY (MACHINERY) LTD., "FORD HOUSE," 88 REGENT ST., LONDON, W. 1. ENGLAND

The Hand on the Doorknob . . .

TURNS A PIECE OF SHAPED WIRE



The use of wire drawn to special shapes is a fast-growing industrial practice. More and more manufacturers are learning how Continental shaped wire made to fit a particular application can cut costs and improve their products.

Continental wire is made in standard and special shapes in a great variety of sizes, tempers, and finishes. There is a Continental wire to enhance the "sales appeal" of the items you manufacture. Your products may have one or more parts that can be "shape-engineered" from wire to do their job better and more economically. Write today for a copy of Continental's handy booklet with helpful wire information for manufacturers.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

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NO SCRAP - *NO STEEL*

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REMEMBER this--It requires large quantities of scrap to produce each ton of prime new steel. So to increase the possibility of making more steel available, turn in your scrap through your regular channels. Do it now! Keep it coming!

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Manufacturers-Metal Working Compounds
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AUGUST BULLETIN
TO THE WIRE DRAWING INDUSTRY:

Dear Sirs:

Your customers who specify an extra bright, clean finish for subsequent plating or welding will be satisfied with the finish obtained by using our lubricant listed as No. 33.

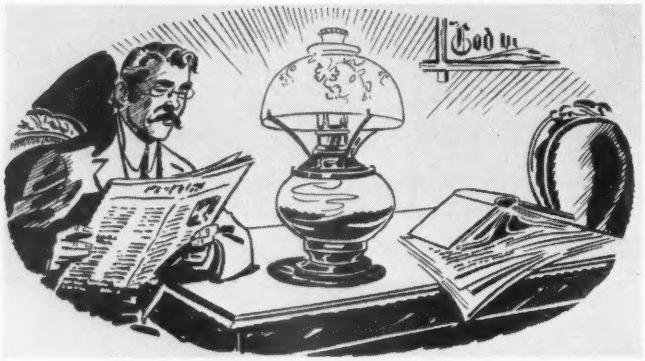
For cold heading and whether single or double extrusion is performed, with a lubricant coating which will not pack or gall and which will give extraordinary die life, use our No. 83.

Both of the above compounds are formulated for the exact purpose which they are to perform. Sample lots will be furnished free of charge for test purposes.

Yours very truly,

STANDARD INDUSTRIAL COMPOUNDS COMPANY

THE COURAGE TO BREAK WITH TRADITION



EDISON'S invention of the electric light outmoded the dim oil lamp and created the huge power and light industry. Edison unquestionably had the courage to break with tradition.

Less spectacular, but extremely important to the wire industry, are such developments as the Syncro **D. F. Reeling Unit** for high speed operation.

This machine, with a full reel capacity of 1000 lbs. of #4 to #18 B & S gauge wire, is independently motor driven through a Syncro Magnetic Slip Clutch. This drive provides smooth, shockless starting and stopping. Moreover, any desired wire tension is obtained by a simple manipulation of a rheostat— and the tension remains constant from empty to full reel. A solenoid brake insures rapid deceleration.

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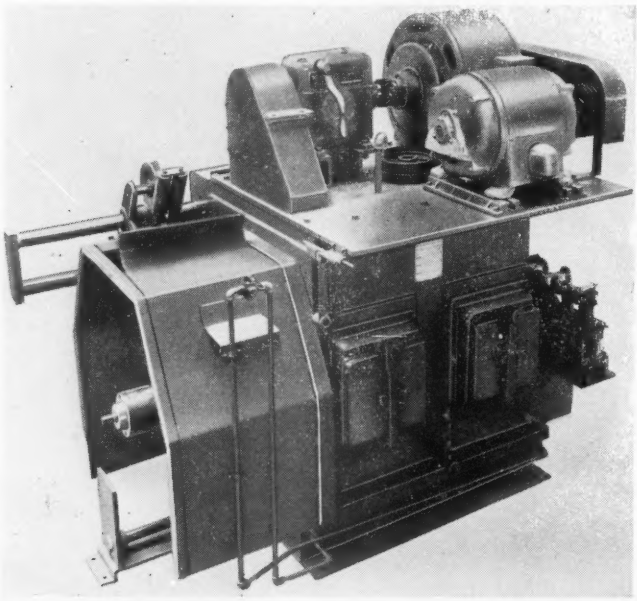
The **Syncro D. F. Reeling Unit** steps up production because it is fast, safe, easy and economical to operate. Write for complete details.



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EXECUTIVE OFFICES AND GENERAL WORKS — 611 SAYRE AVENUE, PERTH AMBOY, N. J.

Machinery for the Wire Industry

SYNCRO

Talide
(TUNGSTEN CARBIDE)
Cutting Tools

stock immediately available

Talide TOOLS AND TIPS ARE AT YOUR FINGERTIPS

We carry complete stocks of standard Talide Tools and Tips at the following warehouses. Call them for fast service:

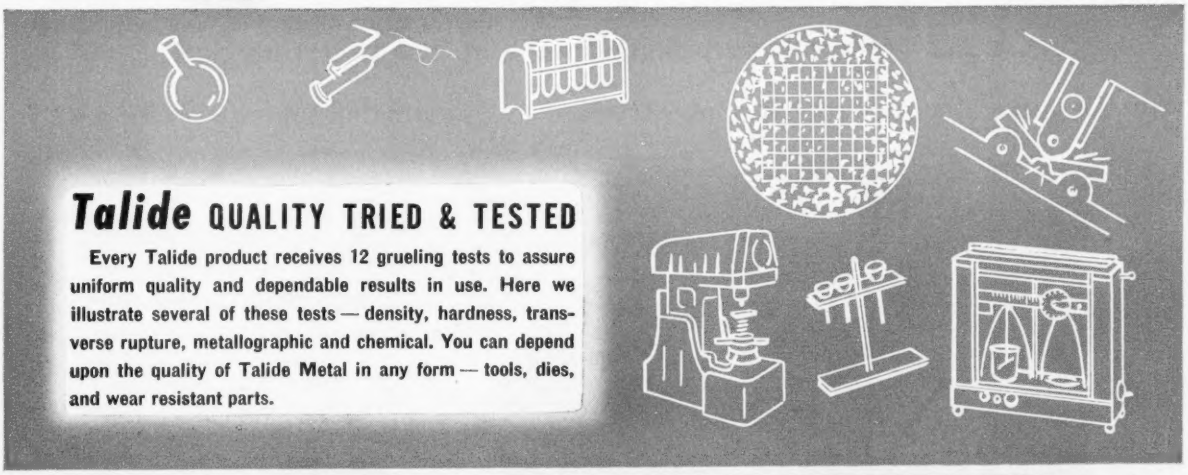
Newark, N. J., 166 Bloomfield Ave.
Youngstown, O., 107 E. Indianola Ave.
Chicago, Ill., 601 W. Milwaukee Ave.

We also have Talide sales engineers in the following territories who will be glad to assist you in any phase of tungsten carbide application, or in obtaining stock: Newark, Pittsburgh, Cleveland, Detroit, Indianapolis, and Chicago.

WHY PRODUCTION MEN USE *Talide* CUTTING TOOLS

Talide Tools remove metal 2 to 3 times faster than the fastest tool steel. Made from the hardest man-made metal, they wear much longer, and only require infrequent redressings. You can use Talide Tools for machining all kinds of steel, cast iron, non-ferrous metals and non-metallic materials.

Send for engineering-style catalog 46-T "Standard Talide Tools and Tips."



Talide QUALITY TRIED & TESTED

Every Talide product receives 12 grueling tests to assure uniform quality and dependable results in use. Here we illustrate several of these tests — density, hardness, transverse rupture, metallographic and chemical. You can depend upon the quality of Talide Metal in any form — tools, dies, and wear resistant parts.

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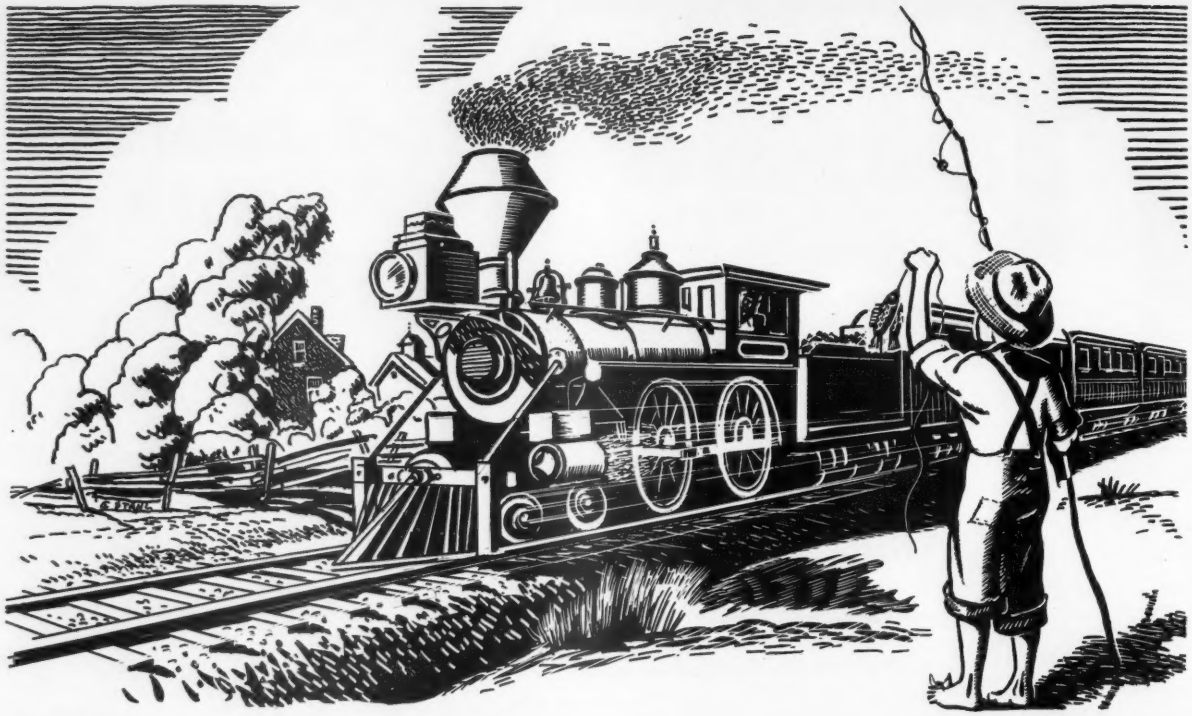
METAL CARBIDES CORPORATION

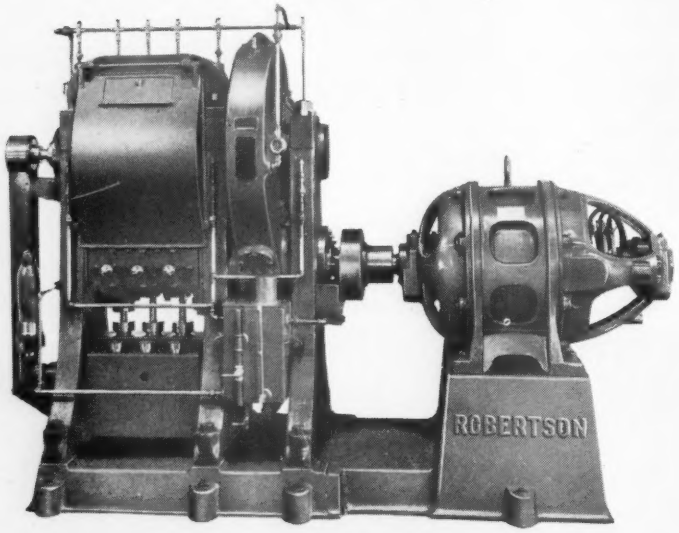
YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS · DRAWING DIES · WEAR RESISTANT PARTS



When Grandpa was a Boy...

Robertson had already pioneered and attained leadership in the design and manufacture of high-pressure hydraulic equipment. More than four generations of *specialized engineering* and manufacturing experience and craftsmanship have only served to consolidate that superior position.



Designers and builders of all types of lead encasing machinery for rubber hose and electrical cable manufacturers, Robertson is always ready to serve you.

JOHN Robertson
COMPANY, INCORPORATED
125-135 WATER STREET, BROOKLYN 1, NEW YORK
Designers and Builders of all Types of Lead Encasing Machinery
Since 1858

V-R

TANTALUM/TUNGSTEN CARBIDE DIES!

assure you of...

1. GREATER STRENGTH:
Tapered nib design increases absorption of drawing stresses. Side walls of nib are taper-gripped resulting in tremendous die strength.

4. CONCENTRICITY:
V-R method of precision die manufacturing assures you of a perfect, concentric drawing surface.

2. SIMPLE MAINTENANCE:
Tapered-grip casing means no steel casing to cut for refinishing or resizing... a real time and cost saver!

5. FREE OF POROSITY:
Another outstanding achievement is the V-R die quality control for the elimination of porosity in carbide. In addition, V-R Tantalum/Tungsten carbide die nibs take a higher finish than any other die material.

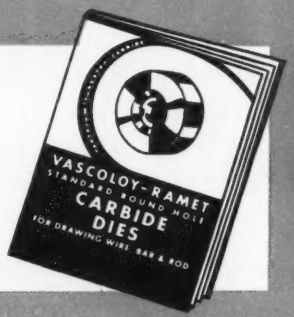
3. MAXIMUM VISIBILITY:
Extra wide tapered front and back openings permit simple, easy inspection, better lubrication.

For unsurpassed performance, V-R carbide dies for wire, tubing, bar and rod, cost less than any other die material!

Comparative performance, in addition to exhaustive laboratory tests and wide spread, practical field applications, place V-R carbides at the forefront of carbide die design and development.

REMEMBER TOO, V-R carbide dies are precision engineered by cost-conscious V-R engineers to reduce YOUR carbide die costs.

Send for your free copy of the Vascoloy-Ramet Standard Round Hole Die Catalog. Address Dept. WW647.



MAKERS OF WORLD'S FINEST VR Carbides

For increased wire, rod or bar production performance call your nearest Vascoloy-Ramet Field Engineer — the man who knows the solution to your carbide die problems.

VASCOLOY-RAMET CORPORATION NORTH CHICAGO ILLINOIS. U. S. A.
District Sales and Service in Principal Cities
AN AFFILIATE OF FANSTEEL METALLURGICAL CORPORATION AND VANADIUM ALLOYS STEEL COMPANY

Your Advertising in the Convention Issue of Wire & Wire Products

will have many extra values. This issue has longer than average life, added circulation, frequent use for reference and identity with the outstanding event of the year in wire circles — the Annual Convention of the Wire Association.

The four day convention this year will be held in Chicago, starting October 20th, with headquarters at the La Salle Hotel. The program will include technical sessions, plant visits, a symposium on matters of wide interest and several special functions.

The October WIRE AND WIRE PRODUCTS plays an important part in the Convention. It carries preprints of many of the papers to be delivered at the technical sessions, a program of the Convention activities and other valuable features. The special advertising carried in the October number is of great interest and value to our industry.

Manufacturers of wire, machinery, equipment, supplies and services used by manufacturers of wire and wire products should all be represented in this great October issue. Many space reservations have been received. A great many advertisers take larger space because of the importance of the event. If you have not yet done so, will you please send your order immediately?

Your advertising makes possible the invaluable editorial services rendered by WIRE AND WIRE PRODUCTS to the Wire Industry. But, in return, you are given an opportunity to place your name profitably before a field whose purchases help to keep your business going.

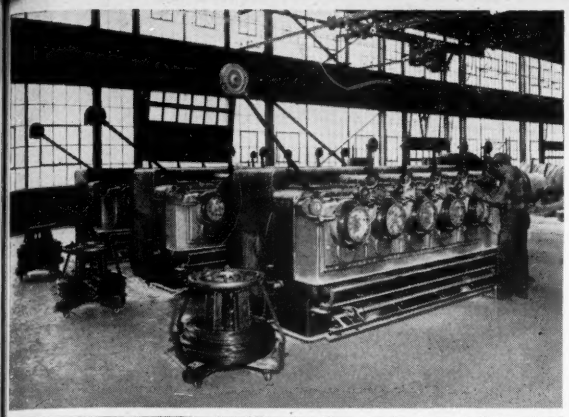
PLEASE SEND FOR RATES AND DATA — BUT GET THE ORDER IN PROMPTLY.

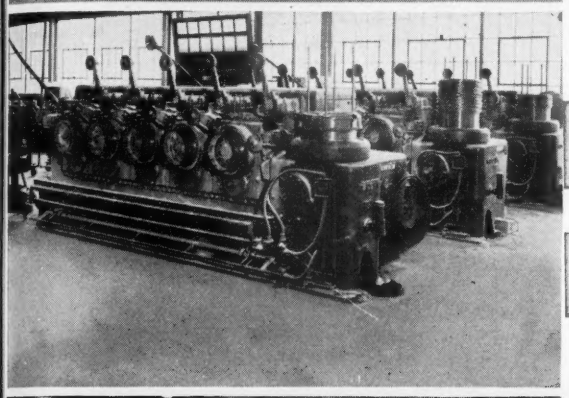
Edmund D. Sickels, Advertising Manager

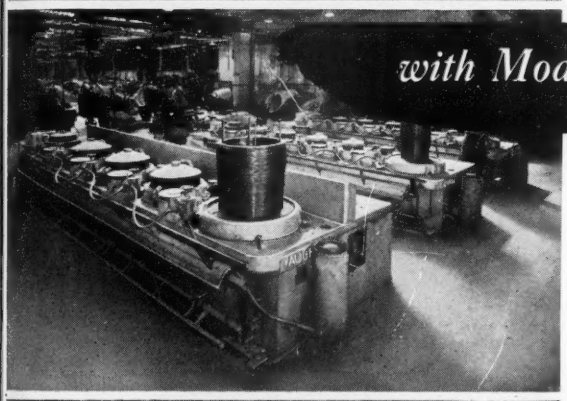
WIRE AND WIRE PRODUCTS

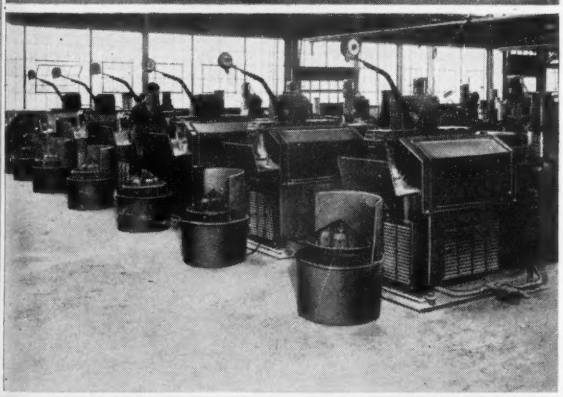
300 MAIN STREET STAMFORD, CONN.

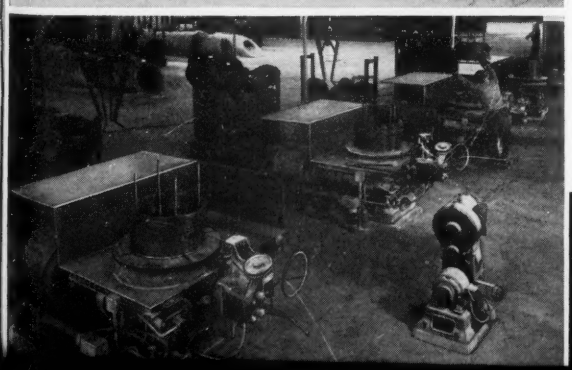
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION







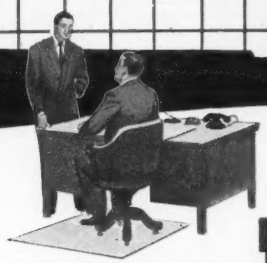




PEG PRODUCTION HIGH

. . . NAIL COSTS DOWN

with Modern, Efficient



Vaughn

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First and foremost in your calculations of products, markets and profits is the constant factor of top machine productivity — when your cold drawing equipment bears the VAUGHN nameplate! This definable performance is achieved with maximum operating economy, by superior design engineering throughout the complete Vaughn line. Let us relate these facts to your manufacturing program !

THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys

TO MEET THE GROWING INDUSTRIAL DEMAND...

AERO BRAND STEARATES

CALCIUM . . ZINC . . . ALUMINUM . . . MAGNESIUM

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AERO BRAND STEARATES

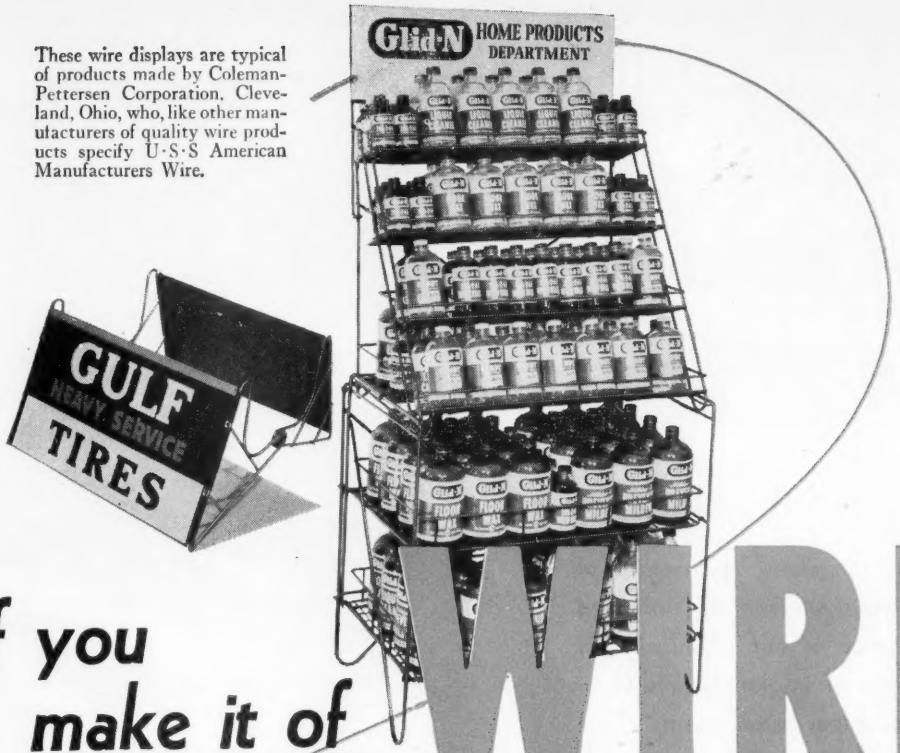
Industrial Chemicals Division

AMERICAN CYANAMID COMPANY

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

*Trade Mark

These wire displays are typical of products made by Coleman-Pettersen Corporation, Cleveland, Ohio, who, like other manufacturers of quality wire products specify U·S·S American Manufacturers Wire.



If you make it of WIRE

...make it of the best!

THERE are ample reasons why more and more manufacturers of wire products are specifying U·S·S American Manufacturers Wire.

U·S·S American is good wire. It is easily fabricated . . . uniform in finish . . . free from imperfections. And products well-made with American Manufacturers Wire usually enjoy repeat business rather than "one-and-done" sales.

Our specialists are always at your service to help you select for your use, from among our 400 different types of wire, the one best suited to your purpose.

For a free consultation, write to American Steel & Wire Company, 412 Rockefeller Building, Cleveland 13, Ohio.

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Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
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Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
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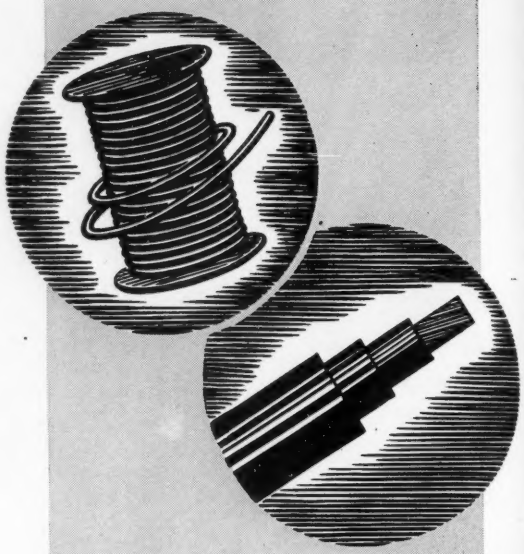
U·S·S AMERICAN MANUFACTURERS WIRE

Specialized

RESEARCH EXPERIENCE

In Insulating Wire Finishes



You are invited to attend a meeting of minds between your engineering staff and ours. The experience of our technical staff embraces all types of insulating finishes to meet the most exacting requirements.

Every formulation is engineered to individual specifications for the particular service required.

Special emphasis should be directed to our non-toxic, flame proof, impregnating compounds and solutions. Also to all types of wire and cable lacquer coatings.

STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK — CHICAGO

SERVING INDUSTRY FOR 75 YEARS

HERE'S A WISSCO WIRE IN WHICH *Balanced Physical Properties* ARE ESSENTIAL

Photographs courtesy of Metal Hose & Tubing Co., Dover, N. J. Makers of National Synthetic Hose for all petroleum products.

Fuel hose must stand up under extremes of service and climatic conditions—must reel readily and handle easily. To help meet these requirements, and to prevent collapse under suction or bursting under pressure, the wall of the hose is strengthened with Wissco Hose Reinforcing Wire.

The manufacture of this Wickwire Spencer specialty wire calls for a careful balance between tensile strength and ductility. Wissco Hose Reinforcing Wire is sufficiently ductile to permit easy forming, and it possesses the tensile strength necessary to stand the severe strain to which the finished hose is subjected.

Our mill men, many of whom have been with us for over a quarter of a century, know how to absolutely control, through chemical content, heat treatment and degree of cold work, the tensile strength and ductility of steel specialty wire.

Wissco Hose Reinforcing Wire is but one of many specialty wires produced by Wickwire Spencer, whose craftsmen in five great plants are ready to meet your requirements for high or low carbon steel specialty wire; round or shaped, in a wide variety of sizes tempers, grades and finishes. Send us you order or inquiry.

WISSCO *Wire*

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

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PACIFIC COAST—THE CALIFORNIA WIRE CLOTH CORP., OAKLAND 6, CAL

CF&I

CELANESE*
"Fortisan"*
OF RAYON
MAKES A BIG DIFFERENCE!
*REG. U. S. PAT. OFF.
● for TINSEL CORE
● for BRAIDED WIRE
● for MARKER THREAD
Punishing tests *prove* that FORTISAN is stronger, more uniform, and has greater stability and flexibility. And FORTISAN has uniform electrical qualities as well. Used on electronically heated blankets, telephone cords, hearing aid cords, electric shaver cords, calculating machine cords and other applications *demanding* proven performance from tinsel core, braided wire coverings and marker threads.
FORTISAN makes a big difference; check with us on your next job — the FORTISAN story is important to you.
FORTISAN... New Strands of Strength
PERFECT THREAD CO., INC.
160 JOHN STREET • BROOKLYN 1, N. Y.
* See Fortisan Editorial page 605

The Wire Outlook

With plenty of opinion to the contrary, many business analysts are beginning to doubt that business will suffer as deep a setback this Fall as first predicted. Job levels, stock price trends and retail sales support the belief that basic conditions are more likely to make for good business than bad.

This is not to say that we have not already experienced some degree of recession. "Readjustment" would be a better word. In the effort to get out from under wartime controls, faced with huge orders representing consumer appetite for goods and services, many disparities in values have arisen. Those prices that have gone so high that they are out of line, still have to be knocked down. That type of adjustment in the long-range inflationary cycle in which we find ourselves is being called a "recession". It will be a series of moderate and spotty correctives, in our opinion—not a general and devastating depression.

The Lewis "victory" sets the stage for a new series of demands. These may not come immediately, but are in the air. The healthier labor-management relationship set up by the Taft-Hartley law, given sincere efforts to enforce it, should provide our country with a better basis for that prosperity to which it is entitled and that is required for general well-being at home and abroad. No cooperation is to be expected from labor leadership, which resents any curb on its freedom to be irresponsible, but the fact is that labor itself will be better off as a result of the overriding of the ill-considered Truman veto.

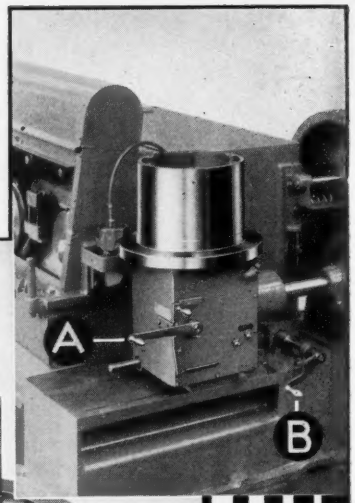
While the demand for wire has receded slightly, there is a market for practically everything that can be produced. Heading wire requirements are great. Galvanized wire is particularly short and, with the spurt in building, nails are again much needed. Bale ties, wire fencing and other merchant forms are in healthy demand, with upholstery tacks off, because of resistance to prices on current furniture offerings. Manufacturers wire continues strong, wire rope sales have picked up and those for electric cable have eased. The coal "holiday", with its effect on steel output has deferred that happy day when demand will be offset by supply. The end of this quarter should see a better balance in the process of establishment. Copper production, with the exception of the vacation shut-downs, has been running at peak levels, with demand from wire mills running strong. Brass mill calls for copper continue active, in spite of the fact that practically all the big backlogs of orders have been washed out and deliveries are now fairly prompt. A better supply of copper is expected for the second half.

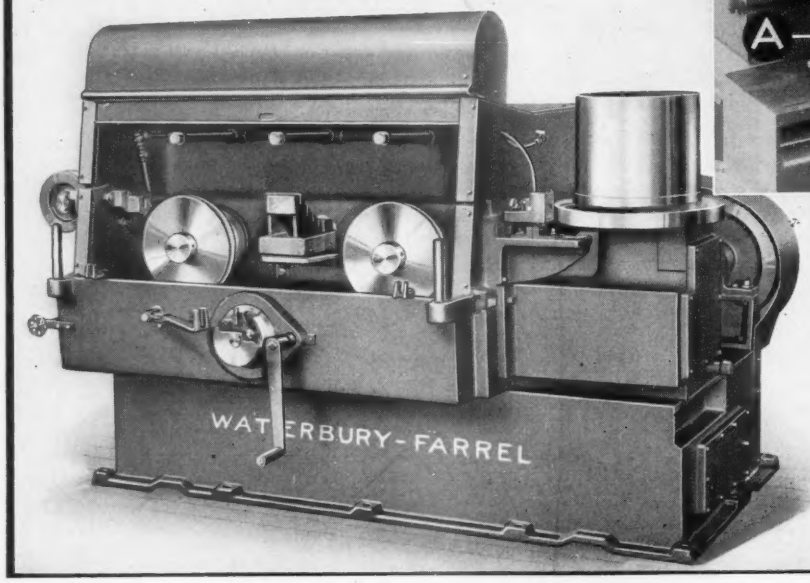
Gradual improvement in the supply of tin may be expected. 4800 tons came in from Malaya during the first half and steps are being taken that should increase supplies from other sources. Lead stocks are now said never to have been as bad at is was feared they might become, high prices having attracted much of this metal to our markets. So far as zinc is concerned, even Prime Western is now quoted as being readily available for the first time in several years.

It would be helpful to business in general if our Administration were to confine its energies to administrative functions. Its call for lower prices had only the effect of getting buyers to hold off for reductions that in the main could not materialize. Its opposition to the demand for better labor laws only strengthened the determination of labor leaders to resist and circumvent the new law. Some day, the United States will be returned to the people, not to a segment of it, and from then on we may expect a greater degree of unity and harmony.

—from the Editor's Desk

WIRE DRAWING MACHINES





FOUNDED WATERBURY FARREL 1851

by WATERBURY-FARREL

WITH WIRE BLOCKS WHICH *rotate in either direction*

Upright Cone Continuous Machines with provision for quickly changing the rotation and position of block.

Two conveniently located removable handles do the trick in jig time—

A — changes direction of rotation
B — shifts position of block . . .

The machines are available with blocks of various diameters or with spooling devices. Our wire drawing machinery is described in Catalog W.

• WIRE AND ROD MACHINERY • COLD HEADING MACHINERY, ETC. •

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY • CONNECTICUT • U·S·A.

CHICAGO NEWARK, N. J.

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 22 AUGUST 1947 No. 8

Designated as
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FLANGED STEEL TRAVERSES

... eliminate the labor of handling large numbers of small parts ... make it easy to assemble reels in four simple steps.

And, they make up into strong reels that can be used over and over. Actual experience records show as much as sixteen years' service without refinishing or major maintenance, as well as a 50% to 100% increase in the number of trips before cut downs or scrapping of wooden heads.

Stevens Flanged Steel Traverses are manufactured in sizes up to 56" diameter and 48" traverse—in plain, painted or hot dip galvanized finish—as light as 18 gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. *Write for prices.*

• • •

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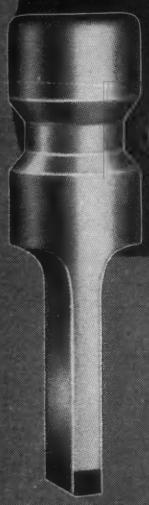

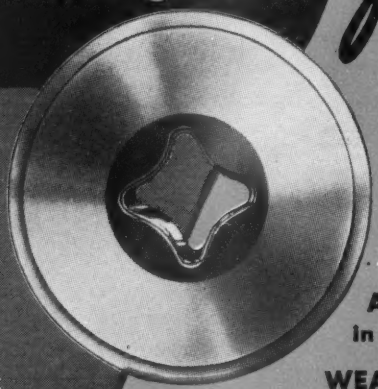

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Use of Wire Drawing Compounds

by E. L. H. Bastian, Staff Engineer,
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A description of the development of improved wire drawing compounds and an analysis of their application.

THE use of wire drawing compounds, a traditional practice in the wire industry, is recognized by all experienced operators as an important factor in securing economical, efficient production in the mill.

* * *

THE development of new improved drawing compounds and other wire drawing materials and fluids has kept pace with modern improvements in drawing machines, dies, heat treating, and mill technique. The proper selection, mixing, application, and care of the drawing compound or fluid can insure substantial gains in good wire production and operation economies.

* * *

IN analyzing how these benefits can be realized by this approach let us consider, in order, the requirements imposed on wire drawing compounds, the composition of such compounds whereby they meet these requirements, the preparation and application of fluids made from compounds, and lastly, but very important also, the maintenance and care of fluids in service.

* * *

IN wire drawing, the fluid, solution, emulsion, coolant or lubricant, as it is variously termed, is required to do four essential things. It must:

1. **Lubricate the drawing dies and wire to maintain low coefficient of sliding friction between the two, minimize power requirements on the machine, and make for ease of metal deformation to the final wire form.**
2. **Cool the dies and wire to optimum temperature range for best draw at required production speed on the machine.**
3. **Provide anti-welding between dies and wire, to prevent metal pick-up, and thus insure good die life and wire finish.**
4. **Maintain reasonable stability in service; resist premature rancidity, separation, and decomposition; not form objectionable metallic soaps (important in copper wire drawing); and resist formation of odorous gases objectionable or even physiologically detrimental to workers.**

* * *

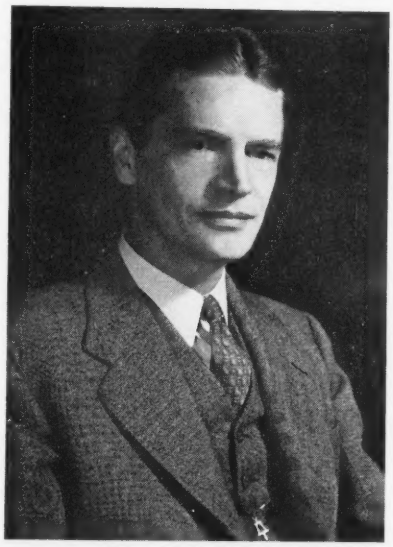
THESE are general requirements of all wire drawing fluids. There are others of a more specialized nature applicable to specific cases, which will be discussed in connection with such cases.

* * *

ENGINEERS in the industry will recognize that these requirements are met both on the basis of composition and proper application of fluids or solutions available.

* * *

THE correct composition is important. Except in the case of aluminum wire drawing (where mineral oil fluids are used) practically all wet wire drawing employs solutions or emulsions made up from paste type drawing com-



E. L. H. BASTIAN

E. L. H. Bastian is Lubricants Staff Engineer for the Shell Oil Company, Inc., New York. After graduating from the Case School of Applied Science in 1931 with a B.S. degree in mechanical engineering, he studied at Wayne University, University of Michigan, Columbia University and the John Huntington Polytechnic Institute. He began his career with Shell in 1936, and has become an authority on cutting fluids and emulsions used in precision metalworking. He is a member of the American Society of Tool Engineers, the American Society of Mechanical Engineers, the American Society for Metals, and the National Wire Association.

pounds and water. These paste type compounds are essentially combinations of soaps (sodium, potassium, or aluminum), fats, free fatty acids, and water of composition. They may also contain petroleum sulfonates, germicides, and other addition agents, but in wire drawing compounds, never solid fillers or pigment. The latter are used in some tube and press drawing compounds to impart additional boundary or extreme pressure characteristics to the lubricant. However, they cannot be used in circulating systems (as is the case in multiple die wire drawing machines) due to objectionable build-up and danger of clogging lines when machine is shut down.

* * *

LUBRICATION is provided by both soaps and fats. Typical of the latter commonly used in drawing compounds are tallow, lard oil, degras, palm oil, rapeseed oil or hydrogenated oils. Free fatty acid is controlled to meet the needs of specific cases. This will be discussed under application methods and recommendations.

* * *

SINCE soap dispersions, fats, and fatty acids possess pronounced tendency toward formation of surface films, due to polar characteristics, they also assist materially in minimizing metal welding on dies, or 'pickup", as it is generally known.

* * *

THE eminent suitability of water as a coolant is recognized and used in wire drawing fluids. Practically all such fluids, as used at the machine, contain from 94-99% water. Thus, the water provides the necessary cooling of dies to assure proper drawing, good die life, and maintenance of size on wire drawn.

* * *

MODERN drawing compounds incorporate the best grades of soap and fat constituents to secure good emulsion stability in service, and resist premature rancidity and deterioration. Compounds used in the drawing of copper and copper alloy wire often contain oxidation inhibitors to prevent formation of fatty acids which in turn cause formation of metallic soaps in the system. These copper soaps, if present, are detrimental to good wire drawing. They are characterized by appearance of a green slimy scum on the fluid and deposited on interior surfaces of the machine. Some drawing compounds and wire drawing fluids contain a germicide to minimize or prevent propagation of bacteria growth in event such bacteria may be present in the water used in the system.

* * *

THE relative proportion of various components in wire drawing compounds is adjusted by the compound manufacturer to suit the use to which they will be put. Thus, compounds for steel wire drawing are different from those intended for copper wire drawing. Also, the speed of drawing, size of wire, percent reduction, etc., play a part in dictating the correct compound composition for the job.

* * *

WHILE composition of the compound is important in meeting the service requirements imposed on the wire drawing fluid, as previously stated, the right application of fluids is equally important in securing optimum results. Application includes preparation of the fluid from the compound, preparation of the system, introduction of the fluid into the system, and maintenance of the correct fluid in drawing service.

* * *

IN preparing fluids or emulsions for use, the paste type compound should be mixed with hot water (temperature about 160°F.) and agitation employed to insure a thoroughly homogeneous mixture of water and compound. Hand paddle, or, preferably, mechanical agitation may be used in this operation. Generally, a highly concentrated mix or slurry is first prepared and then further diluted with water to secure the desired concentration of soaps, fats, etc. Thorough mixing is doubly important where the fluid is to be used in a circulating system such as employed in most wire drawing machines.

* * *

REGARDING handling of compounds in the plant, they should be stored under cover and not exposed to extremes in temperature. Exposure of good compound to air for long periods dries out moisture content making for mixing difficulties. Exposure of compound, even in sealed containers, to hot summer sun or freezing temperatures is not conducive to securing best results either in mixing or machine service of the fluid.

* * *

THE system should be carefully cleaned before a new batch of emulsion is introduced into it, particular care being taken to remove old deposits of solids, metallic soaps, and other contaminants. If there is reason to suspect presence of bacteria in the old emulsion or in the system, it should be flushed and treated with a suitable germicide to insure a sterile condition before putting in the new emulsion.

* * *

THE new fluid emulsion will be adjusted for concentration of right amount of soaps, fats, fatty acids, etc., for the particular operation and type wire being drawn. There are three principal classes of wire drawing (based on wire size), by which both ferrous and non-ferrous wire are drawn. These are as follows:

1. **Rod breakdown and heavy wire draw**
2. **Intermediate wire draw**
3. **Fine wire draw**

* * *

ROD breakdown and heavy wire drawing is usually done on draw bench type machines. Intermediate and fine wire drawing is done in multi-die high speed machines. With the exception of some types of steel wire (drawn by dry soap method) the wet wire method of drawing is employed, whereby a fluid or emulsion is circulated over the dies and wire.

* * *

SINCE ferrous and non-ferrous wire drawing entail the use of totally different compounds and fluids, different concentrations, technique, etc., they will be treated separately in this discusison of fluid application, care, and maintenance.

* * *

Ferrous Wire Drawing

AS stated, steel wire may be drawn by either dry soap method or wet wire method or

both. In the former method, uncoated steel wire is first pickled in acid, usually sulfuric, descaled and rinsed in water, lime coated by dipping wire bundles in a 8-10% lime solution held at about 180°F. temperature, baked in an oven at 300-350°F. to harden the lime coat and then passed through a box of dry soap powder preparatory to the first draw. The purpose of the lime coating is to neutralize the cleaning acid, prevent rusting of the wire before drawing, and act as a base coating on the wire to pick up the soap lubricant. The operation of drawing the limed wire through the soap box and subsequent reducing dies is known as the dry soap method. Lime coating or dry soap draw may also be used on steel wire prior to subsequent reduction by the wet wire method through multiple die machines.

* * *

IN the wet wire method, drawing compounds containing soaps and a relatively high fat content (about 50%) are mixed with water to a soap-fat concentration of from 1.5-3% for use. Fluid temperature in the system is maintained at about 120-150°F. Drawing speeds vary dependent on size of wire drawn and steel composition. Rod breakdown speeds are low, whereas fine low carbon wire may be drawn at several thousand feet per minute.

* * *

IN some cases, where lime coating on steel wire is used, there is a so called "salting out" effect resulting from combination of free fats in the fluid with excess lime contamination in the system. This causes formation of insoluble soaps which clog up the system and interfere with proper drawing. This condition can be corrected by use of a compound containing a higher soluble soap content and reduced free fat and fatty acid.

* * *

BOTH low and high carbon steel wire have been satisfactorily drawn using compounds of the above type. They have also been used to a limited extent on stainless steel wire drawing. The latter, however, presents problems in drawing which usually require special study of individual operations. Compounded mineral oils, and wax blends, have been tried experimentally in such applications.

* * *

Non-Ferrous Wire Drawing

COPPER, brass, and aluminum comprise the principal non-ferrous metals encountered in wire drawing. The latter material, aluminum, has recently been receiving a good deal of attention in the industry due to the current supply situation of non-ferrous metals.

* * *

COPPER and brass wire drawing is accomplished entirely by the wet wire method, although on rod breakdown machines, the heavy rod is sometimes passed through a box of acidless tallow before entering the first die. Industry practice is to use fluids prepared from compounds and water. These fluids or emulsions contain from 1-5% concentration of soap and fats dependant upon wire size and speed of draw. Rod breakdown and heavy wire reduction is done with about 4-6% concentration, maintaining the bulk temperature of emulsion at between 140-160°F. Drawing speed may be between 300-600 feet per minute.

* * *

INTERMEDIATE size copper wire is drawn at 600-900 feet per minute using emulsion concentration of 2.5-3% and temperature of 110-130°F.

* * *

FOR fine copper wire drawing (sizes smaller than Brown and Sharpe Gauge # 36) which is sometimes done at finishing speeds as high as 5,000 feet per minute, a much more dilute solution or emulsion is necessary. The latter should be made up from a high soap content compound for best results. Concentration will run from 0.5-2%. The higher the speed of drawing and finer the size of wire, the more dilute should be the concentration. Bulk coolant temperatures for this operation may be 90-110°F.

* * *

THE reason a high soap content compound is recommended is that too much free fat in a fine wire solution used on high speed drawing causes what is known as sticky wire. This is formation of black, sticky deposits on the wire and dies from breakdown of free fat at the die temperature. These deposits may cause breaking of the wire and disruption of production. However, in using high soap materials, some caution must be observed to avoid excessive foaming. Fine copper wire drawing compounds are now available which combine just the right proportion of soaps and fats to prevent either sticky wire or foaming. In general, as dilute a mixture as possible, contingent of course on expected die life, should be used.

* * *

THE types of drawing compounds used for copper and brass drawing usually contain a maximum of about 1% free fatty acid, and also contain an inhibitor to prevent the objectionable formation of such soaps in service. They can be detected by the appearance of a green scum and deposit in the system. They are detrimental to good drawing and proper die life, causing abnormal wear on the latter.

* * *

THE drawing of aluminum wire is coming increasingly into prominence, due to demand for this material, and the present short supply of copper. Aluminum wire is being drawn in the same type of equipment employed for copper and brass wire drawing and at comparable speeds for given size wire.

* * *

MINERAL oil type fluids appear to be superior to water solutions or emulsions in drawing aluminum wire. Aluminum is subject to water stains and attack by alkaline solutions which make the emulsions unsatisfactory. Mineral oils produce the desired drawn finish, and are also more satisfactory with respect to freedom from staining in subsequent heat treating and annealing of wire. The viscosity of oil used depends on the size wire being drawn. Viscosities of 2500 seconds at 100°F., S.S.U. are used on heavy wire draws. Lighter viscosities from 100-250 seconds S.S.U.

@ 100°F are used on wire sizes down to Brown and Sharpe Gauge #36, and even lighter viscosities on finer wire. The oil in the circulating system should be cooled to maintain bulk oil temperature below 150°F.

* * *

THE above comments regard drawing speeds, temperature, solution concentrations, etc., are based on composite observations of industry practice. Recognizing that operating problems vary from plant to plant, and therefore necessitate somewhat different operating and maintenance standards, it is felt that the data cited reflects typical experience.

THE particular solution concentration used in many plants is checked carefully and frequently to insure that the optimum concentration is being used. This control of concentration is relatively simple, consisting of placing a measured sample of solution or emulsion in a graduated flask (measuring cylinder, Babcock flask, etc.) and adding 5-10 cc of acid (sulfuric, hydrochloric) or an acid salt such as potassium bisulfate crystals to the sample to "break" the emulsion and cause separation of soaps, fats, and solids. These float to top of the water and are measured in the graduated neck of the bottle or flask to determine the solids concentration. Adjustment of the emulsion in the system is then made by addition of calculated quantities of components necessary to restore the desired concentration. This control of concentration is generally recognized in the industry as essential to best performance in the mill. Other laboratory tests, such as checks on pH value of solution, presence of contaminants and bacteria, etc., are made by many plants to insure good operation.

* * *

IN conclusion, it may be desirable to show diagrammatically general recommendations for use of wire drawing compounds as discussed in this article. This is shown on chart herewith.

WIRE DRAWING COMPOUND RECOMMENDATIONS

METAL DRAWN	APPLICATION METHOD	% CONCENTRATION SOAP-FATS MIN.	% CONCENTRATION SOAP-FATS MAX.	TYPE* DRAWING COMPOUND	#COMP./GAL. WATER
I. FERROUS					
Carbon Steel, Alloy Steels (Lime Coated)	Dry Soap	100	100	Dry Soap	No Water
Carbon Steel	Wet Wire	1.5	3.0	Type 1	0.2–0.3
Alloy Steels (May be lime coated)	Wet Wire	1.5	3.0	Type 1a	0.2–0.3
II. NON FERROUS					
Copper & Brass Heavy Wire	Wet Wire	4.0	6.0	Type 2	0.5–0.75
Copper & Brass Medium Wire	Wet Wire	2.0	3.0	Type 2	0.3–0.4
Copper & Brass Fine Wire	Wet Wire	0.5	2.0	Type 3	0.1–0.3
	Wet Wire	0.5	2.0	Type 4	0.1–0.3
Aluminum-Heavy	Circulation	—	—	Type 5	No Water
Aluminum-Medium	Circulation	—	—	Type 6	No Water
Aluminum-Fine	Circulation	—	—	Type 7	No Water

***TYPE DRAWING COMPOUND (FROM CHART)**

Type 1 — Steel Wire Drawing Compound containing soaps, fats and water. High fat and free fatty acid are recommended.

Type 1a — Steel Wire Drawing Compound containing high soaps and emulsifier base. Low fat content, low free fatty acid, use for lime coated wire.

Type 2 — Copper Wire Drawing Compound similar to Type 1 except low free fatty acid, and may contain inhibitor to prevent "green scum" formation.

Type 3 — Copper Wire Drawing Compound of high soap type to be used in conjunction with Type 2 compound for fine wire drawing. Low free fatty acid. May contain inhibitors.

Type 4 — Copper Wire Drawing Compound for fine wire drawing. Similar to combination of Types 2 and 3. High soap content, low free fatty acid.

Type 5 — Aluminum Wire Drawing Oil of S.S.U. viscosity 2000–3000 @ 100°F, for heavy wire draws. May be straight mineral or compounded.

Type 6 — Aluminum Wire Drawing Oil of S.S.U. viscosity 100–250 @ 100°F. for medium wire draws.

Type 7 — Aluminum Wire Drawing Oil of S.S.U. viscosity 50–100 @ 100°F. for fine wire draws.

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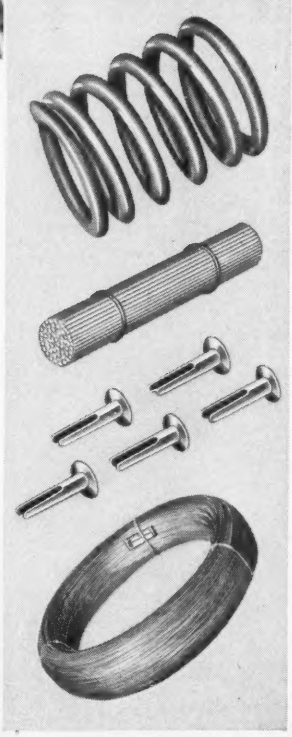

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The Aetna Wire Drawing Unit

by E. J. P. Fisher and A. L. Thurman
Wire Mill Consultant Asst. to the Vice President
The Aetna-Standard Engineering Company
Youngstown, Ohio

Published in two parts.
This is Part I.

IN the brief period of three years before the outbreak of World War II, a modern continuous non-slip wire drawing machine was conceived, designed, manufactured and production tested by the **Aetna-Standard Engineering Company** of Youngstown, Ohio. Due to the urgency of the ensuing Defense and War production programs, the marketing of this new wire drawing machine was deferred to expedite manufacture of military and naval ordnance materiel.

* * *

BECAUSE of its inherent design and operational advantages, the Aetna Unit has survived this temporary deferment and is again being groomed for its productive role in the Wire industry.

* * *

History

THE Aetna Wire Drawing Unit, as illustrated by Fig. 1, is a self-contained vertical wire drawing block driven by a motor through a suitable gear train. The unique design of the Aetna Unit was conceived in 1937 by **Kenneth B. Lewis** and the late **Jerome R. George** as one in which the vertical block and spindle was to be driven by a vertically mounted motor through a simple double reduction spur gear train. They further conceived the idea that two or more of these compact Aetna Units could be placed in line for tandem operation as an integrated continuous multi-draft wire machine, utilizing the overhead system of wire take-off from unit to unit.

* * *

THE first Aetna Multi-Unit Wire Drawing Machine was exhibited at the National Metal Exposition in Detroit in October 1938. It consisted of three (3) Aetna Units with water-cooled 22″ blocks arranged as shown in Fig. 2. Each unit was powered by a 25/30 H.P., 500/1500 RPM, 230 volts, vertical D.C. motor with a field rheostat for manual speed adjustment. The finishing unit was geared to deliver 400 to 1200 feet of wire per minute and its field rheostat could be manually set to any operating speed within that range. The speeds of Units No. 2 and No. 1 could be manually synchronized with that of Unit No. 3 to compensate for the elongation of the wire from draft to draft.

* * *

AFTER the Detroit exhibit, this 3-Unit machine with its manual rheostatic control was thoroughly tested for its wire drawing capacities, power consumption and operability. The results of these production tests gave Aetna engineers the incentive to develop some suitable means for automatic inter-unit speed synchronization. The basic means for automatic rheostatic control was found in the overhead system of wire take-off, namely in the movement of the floating take-off guide and chain, which slipped freely in a peripheral groove located near the top of the block. See Fig 2.

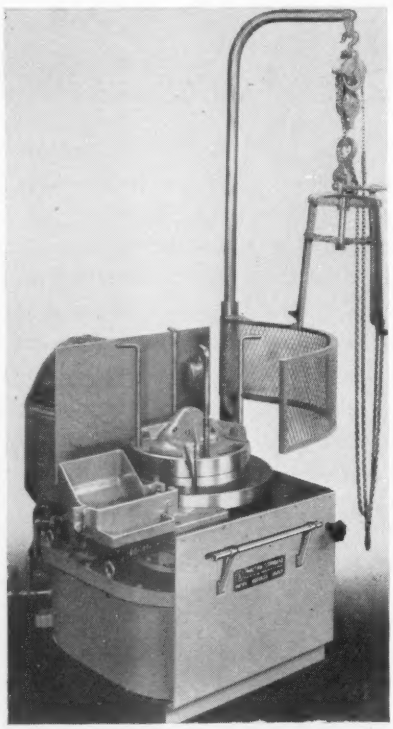


Fig. 1 * * * *

* * *

IT is a characteristic of a multi-draft wire machine wherein the overhead take-off system is utilized, that so long as wire is being removed from the top of one block by a succeeding block at the rate at which it is being drawn on to the lower portion of the first block, then the floating guide, over or through which the wire is withdrawn from that block, will remain stationary. That is, if the relationship between the speeds of the two blocks exactly compensates for the elongation of the wire after it has been drawn through the successive dies, each located ahead of its respective block, then the same weight of wire will be drawn on to both blocks per unit of time and the wire will be withdrawn from the top of the first block at precisely the same speed at which it is being drawn on to the lower portion of that block. Thus the same number of turns of wire will remain on the first block as long as this state of inter-block speed synchronization exists — and the floating guide and chain at the top of the first block will remain stationary with respect to the central axis of that block.

* * *

IF wire is being withdrawn from the first block faster than it is being supplied thereto, then the

number of turns of wire on that block will be reduced and the floating wire take-off guide and chain at the top of the block will rotate around the central axis of the block in a direction opposite to the rotation of the block.

* * *

ON the other hand, if the wire is being removed from the top of the first block at a slower rate than it is being drawn on to the lower portion of that block, then the number of turns of wire on the block will increase and the floating wire take-off guide and chain will rotate around the central axis of the block in the direction of rotation of the block but at a slower speed.

* * *

IT was this characteristic movement of the floating take-off guide which the Aetna engineers recognized as the primary source of actuation for some form of automatic rheostatic inter-unit speed control. Initial attempts to harness this motion, through electrical switches and relays to a motor driven rheostat, proved impracticable; but they did result in abandonment of the chain-type wire take-off guide and led to the eventual development of a superior floating take-off guide ring and sheave such as shown in Fig. 3 and Fig. 4. Finally, in the Spring of 1939, E. J. P. Fisher invented and patented a simple and effective geared connection between the floating wire take-off guide and the controlling rheostat shaft. The details of the Aetna-Fisher auto-rheostatic speed control are cited in a later section of this paper.

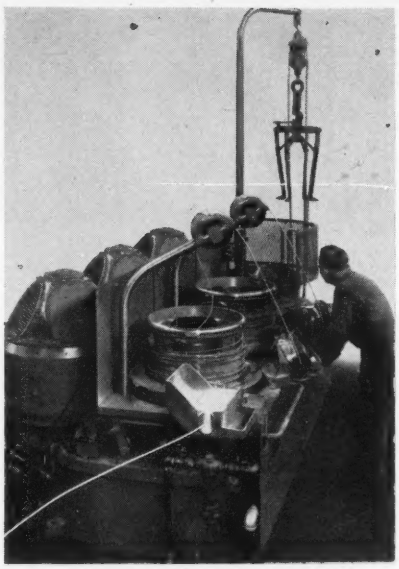


Fig. 2 * * * *

WITH the development and application of this unique automatic synchronizing control, the Aetna Wire Drawing Unit attained the ultimate degree of productive and versatile utility. — It had "come of age".

* * *

Unit Construction

THE basic construction of the Aetna Wire Drawing Units is the same — whether it is used as a single draft unit or as one of a series of units for tandem multi-draft operation. There are several Aetna Unit components, which are interchangeable in Units of the same size, namely —

a) Main Frame or Unit Base which supports the block spindle housing and vertical motor, enclosing all gears in an oil tight base housing.
b) Shafting and Bearings.
c) Lubricating System including pump, tubing, pressure gauge, level indicator and fittings.
d) Block Spindle Housing with integral circular trough for collection and drainage of block cooling water.
e) Water-Cooled Die Holders with spherical 'cast' adjustment and arranged for either dry or wet drawing.
f) Pushbutton Starting Control Station with a 'Thread' button for slow starting and a 'Run' button for full voltage running speed.
g) Stopping Control Bar and Switch Assembly.

* * *

OTHER Aetna Wire Unit Components, which have limited interchangeability on Units of the same size, are: —

a) Helical Spur Gears and Pinions in main drive gear train — interchangeability dependent only upon ratios required.
b) Drawing Blocks — several types — double deck, intermediate, finishing, etc. — all water-cooled, interchangeability dependent only on usage.
c) Die Boxes — two types — starting and intermediate — arranged for dry drawing lubrication and/or collection and drainage of wet drawing lubricant.
d) Vertical Motors — interchangeability dependent only on power rating and usage.

* * *

INTERCHANGEABILITY of Unit Components is only one of the several advantages of the Aetna Unit construction. Other advantages are:

1. Compact arrangements of vertical motor behind vertical block spindle on common Unit base — minimum floor space requirement per block.
2. Two or more Aetna Units can be arranged in line for alternate use as
a) single draft machines
or b) one or more tandem multi-draft machines.

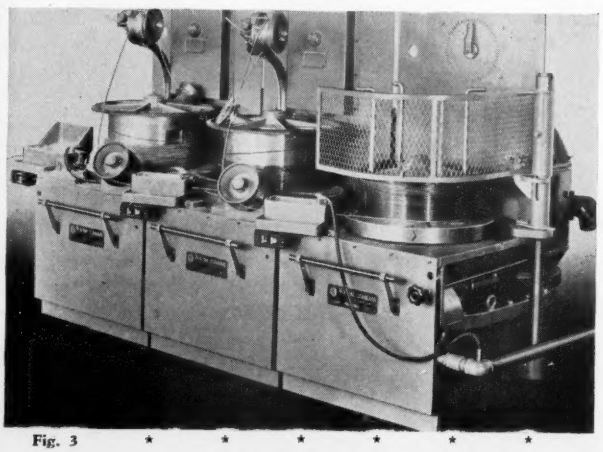


Fig. 3 * * * * * *

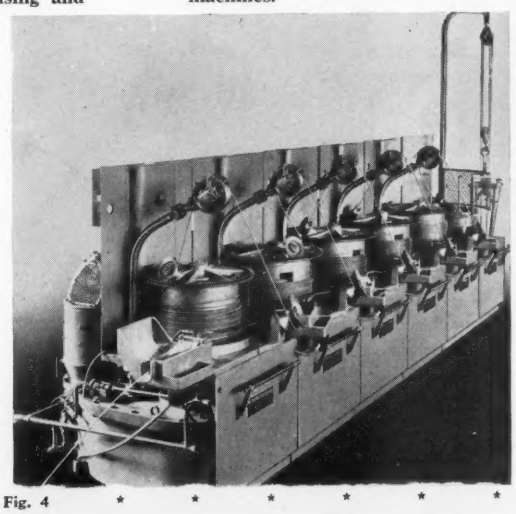
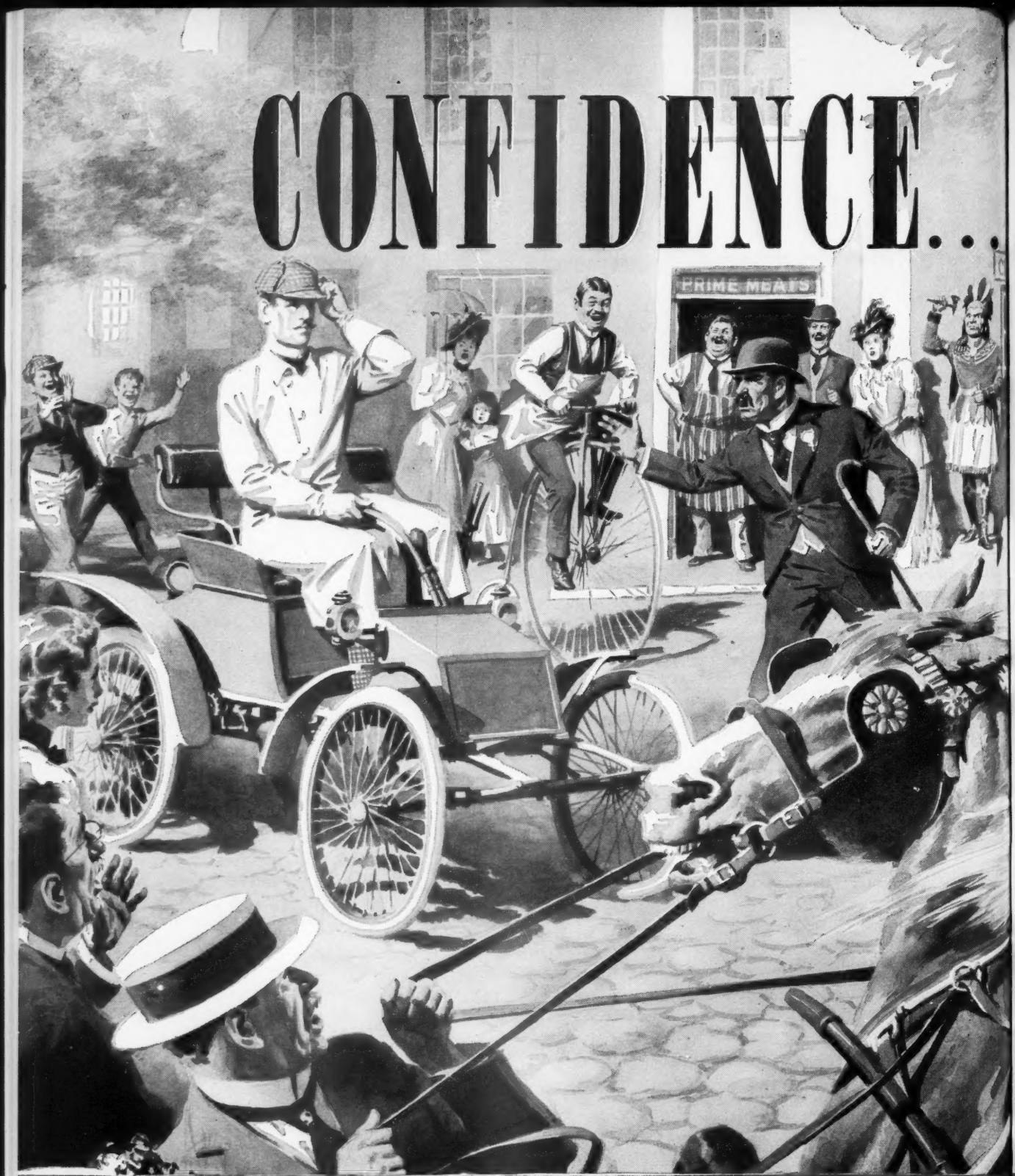


Fig. 4 * * * * * *



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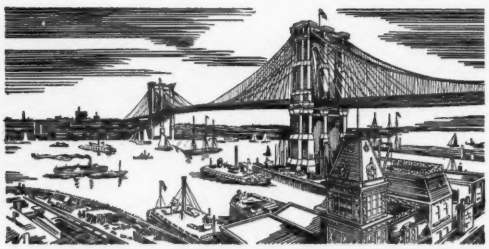


IT WAS NINE YEARS before the first gasoline-driven automobile in the United States was operated by C. E. Duryea that the Brooklyn Bridge was opened in 1883. This fabulous engineering achievement was the culmination of over 26 years of planning and building, of bold vision and heart-breaking struggle, by John A. Roebling and his son Washington.

But the steadfast confidence of father and son in the success of their amazing venture is vindicated daily by the modern traffic this world-famous bridge continues to carry now . . . 64 years later.

How much is that confidence worth to you today . . . and to the John A. Roebling's Sons Company, now embarked on a multi-million dollar expansion program to meet the future's challenge?

Confidence is the driving power behind our efforts to make better products do better work for you.

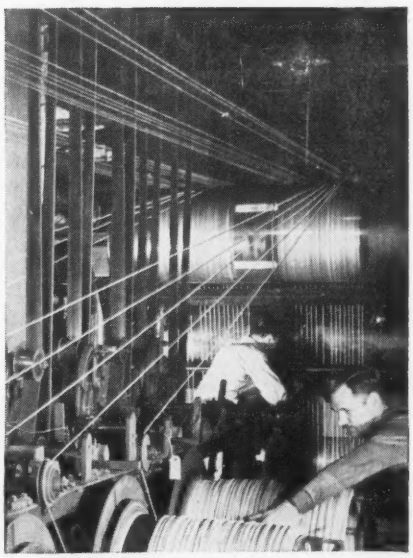
ROEBLING WIRE QUALITY REWARDS YOUR CONFIDENCE—CONSISTENTLY

WHEN YOU SPECIFY ROEBLING, you're sure the wire will meet your toughest specifications . . . down to microscopic measurements, if necessary. That gives you smooth, speedy production . . . fewer machine jams . . . fewer rejects . . . fewer unproductive man-and-machine hours . . . and less chance of damaging expensive dies. It helps you trim costs . . . put lower price tags on your finished products.

Here at Roebling, everything needed to assure wire quality is on hand—the last word in modern, specialized equipment, skilled workmen trained in the Roebling tradition, careful control throughout of the manufacturing process. Add, too, the background of a century's wire-making experience. Little wonder the wire you get is uniformly "tops" in dimensional accuracy, in temper, in finish.

For dependable answers to your wire questions, check first with your Roebling Field Engineer. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities



Systems
Ski Lifts

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

FOR example: Four (4) Aetna Units may be arranged for simultaneous operation as:

4 — single-draft machines
or 1 — single-draft and 1 — three-draft machine
or 2 — two-draft machines
or 2 — single-draft and 1 — two-draft machine
or 1 — four-draft tandem machine

3. **Any Aetna Multi-Unit wire drawing machine, originally arranged and installed for multi-draft tandem operation, may later be divided or other Units added as changes in drawing practice warrant — thereby conserving and utilizing the original investment to full advantage.**
4. **All Aetna Units of the same size are arranged to utilize almost any vertical D.C. or A.C. motor rated within the horsepower and speed range of that Unit size — affording a wide selection of motor sources.**

* * *

Auto-Rheostatic Speed Control

AS stated in the introduction of this paper, the development of the Aetna-Fisher auto-rheostatic synchronizing control was essential to the ultimate productive efficiency and versatile utility of the Aetna Multi-Unit wire drawing machine.

* * *

THE simple and effective mechanical construction of this new synchronizing control is disclosed in Fig. 5 and Fig. 6.

* * *

FIG. 5 shows the position of the motor field rheostat on the rear of the vertical backplate of each Unit of an Aetna 3-Unit Machine. The rheostat coverplates were temporarily removed prior to photography. Note the compact arrangement of the vertical D.C. motors, which were wired temporarily for test purposes prior to shipment.

FIG. 6 shows a front view of the same 3-Unit machine with coverplates removed to disclose the control gear assemblies mounted on the backplates of Units No. 1 and No. 2. Note that the horizontal floating wire take-off guide ring is in effect a bevelled ring gear. It is part of a simple double reduction gear train connecting it with the horizontal rheostat shaft extending through the backplate of each of the first two Units. This floating ring gear carries the small wire take-off guide sheave and is mounted on anti-friction bearings so as to rotate on a vertical stub-shaft, which is fastened to the top of the wire drawing block and is coaxial with the block spindle of each of Units No. 1 and No. 2.

* * *

A friction band is provided to properly tension the wire as it is being withdrawn upwardly from the block over the small guide sheave mounted on the ring gear and to hold the sheave in positive engagement with the wire. This band is fastened to the underside of the floating ring gear and engages a friction drum or flange attached to the top of the block. The frictional pressure of the band on the drum is adjustable. By this means, a simple slip connection is provided, whereby: (1) the ring gear and guide sheave are always urged to rotate in the direction of block rotation; (2) the ring gear is permitted to slip readily whenever the tension on the wire exceeds an amount governed by the friction band pressure adjustment; (3) manual rotation of the ring gear and guide sheave in either direction is permitted when the block is stationary. This last facilitates handling of the wire during threading operations.

* * *

THE tension of the wire for any given adjustment of the friction band pressure will be substantially constant during a wire drawing operation. Therefore, any difference in the relative speeds with which the wire is being drawn on to and removed from the block will be promptly indicated by rotation of the floating ring gear and guide sheave either in the direction of block rotation or oppositely. Likewise, when these wire speeds (take-up and take-off) are equal or exactly synchronized, the floating ring gear and guide sheave will remain stationary.

* * *

THUS, the rotation of the floating ring gear is utilized to turn the rheostat shaft and arm in either direction, so as to synchronize the wire drawing speed of one Unit with the rate of wire take-off imposed by the succeeding Unit.

* * *

AS apparent in Fig. 6, the rheostat on either Unit No. 1 or No. 2 is connected to the upper control gear through an adjustable friction band and slip drum similar to the slip connection on the floating ring gear. This slip device permits the upper control gear to continue to rotate after the rheostat shaft has been turned in either di-

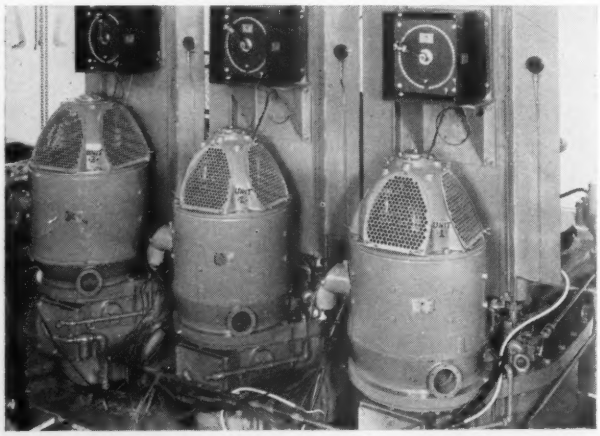


Fig. 5 * * * * * *

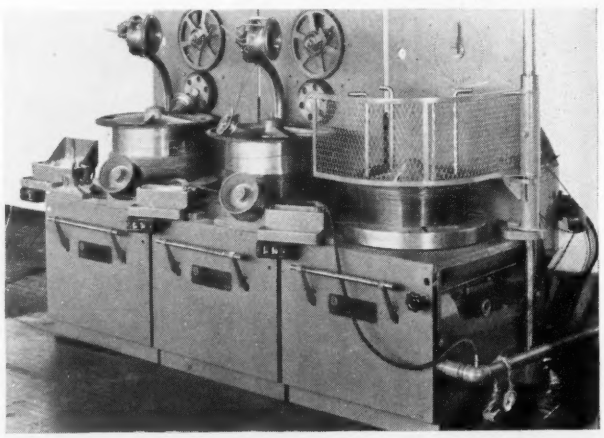


Fig. 6 * * * * * *

rection to its minimum or maximum limit stop, without damage to the rheostat shaft or its control arm, Thus, the full rheostatic speed control range of each Unit motor may be safely utilized.

* * *

THE automatic control mechanism on Unit No. 1 is identical with that on Unit No. 2. However, finishing Unit No. 3 in Fig. 6 has no automatic rheostatic control, because the finishing wire speed must be manually set by the operator of the machine. Hence, the finishing Unit No. 3 is equipped only with a manual rheostat control knob, which operates the rheostat by means of a shaft extending to the rear of the Unit, where it is positively connected to the rheostat shaft by roller chain and sprockets. Note that the rheostat shaft extends through the backplate of Unit No. 3 and carries a pointer to indicate the position of the rheostat arm with respect to the radial scale divisions inscribed on the face of the backplate. This radial scale may be calibrated to show wire finishing speeds in F.P.M. or in any other units of speed indication.

* * *

JUST before the photograph in Fig. 6 was taken, the 3-Unit Machine had been completely threaded and the rheostat of finishing Unit No. 3 had been manually set at approximately the half-way radial mark on its speed indicator dial. Note the ample reserve of wire on each of the first two Units. A small amount of finished wire had been drawn on to the finishing block, as shown.

* * *

ASSUMING this machine set-up, subsequent operation of the machine may be described as follows:

* * *

Step 1

THE operator starts the machine (in tandem) by pushing the left hand "thread" button of the push-button control station, located below the die box of any one of the three units. This brings all the motors up to a slow "thread" or starting speed — considerably below their full voltage base speeds. He will hold this "thread" button in until he has observed the alignment of the wire on the several blocks and sheaves. If the alignment is satisfactory, he is then ready to accelerate the Units to the required running or production speed. During the few seconds of this slow starting operation, the rheostats on Units No. 1 and No. 2 will have been automatically turned back to their minimum or base speed limit stops.

* * *

Step 2

THE operator will then press the right-hand or "run" button to accelerate the three motors in several successive steps of acceleration.

* * *

Step 3

THE operator then stands back to observe the **automatic** acceleration and synchronization of the 3-Unit machine.

* * *

Step 4

UNIT No. 3 is the first to reach its required operating speed, determined by the manual setting of its motor field rheostat. In the meantime, wire is being removed faster from Unit No. 2 than it is drawn on to the block and the floating ring gear and guide thereon is turned in a direction opposite to the direction of block rotation. Thus the motor rheostat of Unit No. 2 is turned "up" to accelerate the motor and block until its drawing speed is synchronized with the rate of wire take-off imposed by the given speed of finishing Unit No. 3. Likewise, in the meantime, the auto-rheostatic control gear on Unit No. 1 has also turned backward, thereby accelerating its motor and block until its drawing speed is synchronized with the rate of wire take-off imposed by the speed of the succeeding Unit No. 2.

* * *

THUS, the speeds of Units No. 1 and No. 2 are automatically synchronized with the selected drawing speed of the finishing Unit No. 3 — so as to compensate exactly for the elongation of the wire through the successive drawing dies.

* * *

THIS automatic acceleration and auto-rheostatic synchronization, as just described, requires only a few seconds of time.

Step 5

ONCE this acceleration and subsequent synchronization has taken place, the machine operation becomes completely automatic. Thus, the machine will run automatically and continuously as long as a continuous strand of rod or wire is being supplied to and through the first die at Unit No. 1.

* * *

DURING continuous operation, the operator may wish to increase or decrease the wire drawing speed of the 3-Unit Machine. He is able to do this (without stopping the machine) simply by adjusting the manual rheostat control knob on finishing Unit No. 3. Any such change in the finishing speed of Unit No. 3 will automatically result in a prompt resynchronization of Units No. 2 and No. 1. There is little, if any, "hunting" or reciprocating movement of the auto-rheostatic control mechanisms during continuous synchronized operation. Normal die wear is exactly compensated for by the auto-rheostatic controls with gradual movement of the auto-control mechanisms.

* * *

THE original reserves of wire on the Units No. 1 and No. 2 will be constantly maintained without increment or decrement over long periods of continuous synchronized operation, because equal weights of wire are being drawn through the three dies at any instant and throughout any continuous run.

* * *

Step 6

WHEN a desired quantity or production lot of finished wire has been accumulated on Unit No. 3, the operator will stop the machine (all three Units in tandem) by pushing lightly against the horizontal safety stopping control bar located at the front of any one of the three Units, as shown in Fig. 6.

* * *

Step 7

THE operator starts the machine wire from Unit No. 3, leaving only enough strands on the block to furnish sufficient traction in restarting after tying the cut end of the wire to one of the upright collector rods. **The foregoing operation steps are then repeated as often as required for continuous production.**

Wright Wire Company
The Germ of Wickwire - Spencer

by Kenneth B. Lewis,
Consulting Wire Mill Engineer,
Worcester, Mass.

An outline and history of the development of the Wright Wire Company at Worcester, Mass. The fourth of a series of articles on the history of American Wire Mills.

THE roots of industrial enterprises often run incredible distances below ground; they make no difficulty over crossing county lines, and they span the centuries without apparent effort. The enterprise now under consideration might be said to have begun with the birth in West Boylston in 1814 of **Erastus Bigelow.** This boy, whose genius chanced to flourish in the area of textile manufacture, started his brilliant career at the age of 14 and in a few years his power looms were producing semi-automatically various special fabrics previously hand woven at prohibitive expense.

* * *

OUT of his enterprise in Clinton, the **Bigelow Carpet Mills,** came, in some way not recorded, the development of a loom for the weaving of wire, and, in 1856, the incorporation of the **Clinton Wire Cloth Company.** Here, for the first time, in America, wire cloth was woven, and for the first time in any country it was woven on a power-driven loom.

* * *

GEORGE F. **Wright,** born in the neighboring town of Westford, was trained as a cabinet maker, and at the time the wire cloth company started operations he was engaged in the manufacture of "horse-powers," a term now long fallen into disuse. Some years ago during a few days spent in the Azores, I was wandering about in Ponta Delgada and came upon a neat little factory for the production of plows. A little cupola glowed in one corner, from which the points were cast in chills, a little forge produced the straps and bolts, there was a drill press and a few wood-working machines, and a paint shop. I never saw a quieter shop in my life. Except for the faint hum of the blower and the swishing of belts not a sound disturbed the quiet conversation of the leisurely operators. There was no panting of steam exhaust, no barking of a Diesel, no whirr of motors, simply a line shaft running in an uncanny hush. I circled around outside to see where the wires led in, for I wanted to check the name of that silent motor; there were no wires. But dimly visible through a small window was the head of an old white horse, enveloped in a nose bag, and nodding slowly up and down. I glanced in and saw that the old mare was slowly walking up an endless wooden hill that moved like the top of a roll-top desk. The word was made flesh; I had at long last seen a one-horse plant!

* * *

IN 1862 Mr. Wright entered the employ of the Clinton Wire Cloth Co. and was master mechanic for twenty years. During this time he made many improvements and inventions, among others the first machine for making hexagon mesh, better known to the layman as chicken wire. This claim could perhaps be successfully refuted by **Gilbert & Bennett;** I do not endorse it. I merely pass it on. In 1882 Mr. Wright, moved probably by a desire to provide for a pair of growing sons, came to Worcester with plans for the establishment of a wire cloth business of his own. After a few months he and the sons incorporated the **Palmer Wire Cloth Co.,** and set up their looms in the building where the Palmer plant of Wickwire-Spencer now stands.

* * *

THE reason for the choice of this spot was the presence on the adjacent lot of the Palmer Wire Co., an established business operated by a Mr. Bullard. I do not know whether he was related to the man of the same name who later was manager of Morgan Spring Co. Within a comparatively short time Mr. Wright's wire supply was put in jeopardy by difficulties of a financial nature next door, and Mr. Wright had to take over the wire mill. The financing required by this operation and an expansion in both units was a little more than the local bank could comfortably manage, and he decided, in 1889, to move to Worcester. His company was then operating under the style **"Wright Wire Cloth Co."**

* * *

THE wire machinery was left in Palmer, the looms shifted to Worcester, where they were set up in the building on Hammond St. formerly occupied by Wood & Light. This became the nucleus of the Worcester branch of the company, and its main office. Wire was shipped in from the Palmer mill. The name was changed againt at this time to **Wright and Colton Wire Cloth Co.,** and in 1902 to **Wright Wire Co.**

* * *

IN 1903 George F. Wright died, and affairs were carried on by his sons **George M.** and **Herbert F.**

Wright as president and treasurer respectively. George M. Wright became best known a few years later to the layman as well as the wire man, through his service of several terms as mayor of Worcester. Just why, along in the nineties, a wire mill was built at the Worcester plant, nobody can tell me. It seems to have come about chiefly because there was space available and a machine shop needing work. To build rather than buy is an instinct implanted deeply in the Wright character, and little diluted by the lapse of time. As a former salesman of wire mill equipment I speak with knowledge on the point, yea even with feeling. I well recall the exasperation aroused in my breast by the amiable habit of the Wrights to accomodate other wire mills with the product of their drafting tables and machine tools in competition with mine.

* * *

THE early years of this century were rather placid ones for Wright Wire Co.; indeed, it was a quiet decade or two throughout the industry; after the hurly-burly of the establishment of the **U. S. Steel Corporation** had died away. The pattern was pretty well set in the matter of practice and equipment, and did not begin to waver until the mid-twenties. The altered conditions at the former Washburn & Moen mills had one decided effect at Palmer; it put Wright into the rope business. Mergers always result in an exodus, great or small, of the dissatisfied, the unadaptable, the restless. From **Washburn & Moen** came a wire rope expert who persuaded Mr. Wright that the production of his specialty was simple and profitable. The names **Waite** and **Stone** are associated in some way with this project, as well as that of **Swanstrom,** but perhaps the chief effect on the mill in general is that it brought **Colin Oakes** as superintendent. Others came and went, but he stayed for years.

* * *

FOR many years a prominent feature of the scene at the Palmer station of the Boston & Albany was the old sagging building across the river marked Wright Wire Co., and patently engaged in the production of light wire goods. It was the first thing to catch the eye of the traveller,, who probably thought, as I did, that it was the ancestral home of the Wright industries. No such thing. It was purchased during this period, just to round out the Wright line of hardware.

* * *

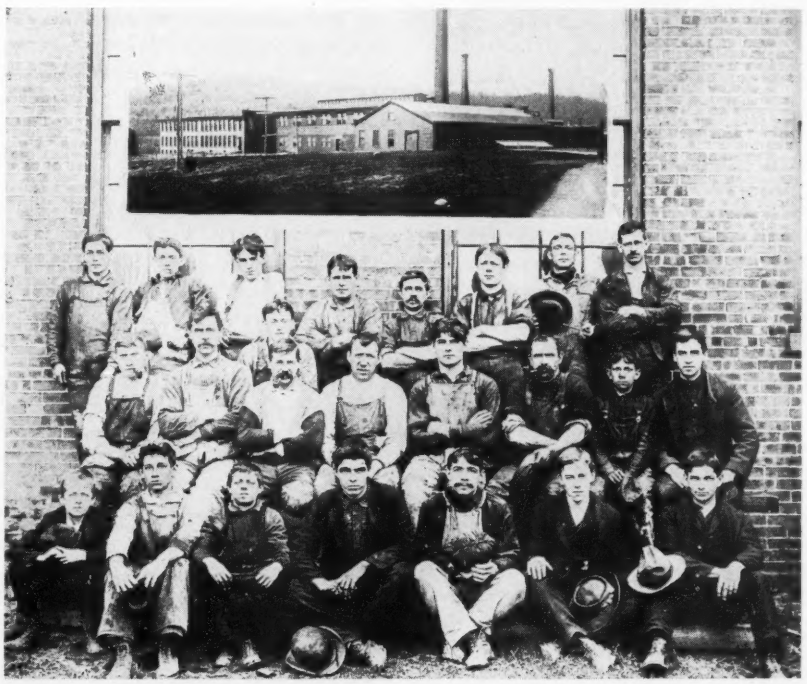
HISTORY begins to roll again along about 1913-14 with the appearance of **J. W. Lauren,** a Finnish engineer who came from Roebling's where he had recently installed the new wire mill at Kinkora. He offered his services to Mr. Wright as an efficiency engineer, and after a brief look at the mill at Palmer made promises of truly remarkable savings. Let me say at once that he made good on those promises. His coming set in motion a train of circumstances of amazing scope. Before I get into this topic I wish to record the fact that a young fellow recently out of school was assigned to Mr. Lauren as a sort of helper and secretary, note-keeper, report writer, and the like, and that the young fellow believes that no small part of the credit for his success as founder and president of the G. F. Wright Steel & Wire Co. is traceable to the lessons he learned on this service.

* * *

WHO ever heard of a superintendent and an efficiency man who had even a mild tolerance for each other? Lauren was by no means a diplomatic, conciliatory type; he smacked more of the Prussian drill-master. Mr. Oakes became glummer and more silent day by day, and one day he failed to show up. He never said a word, just stayed home, and after a decent interval, Lauren became superintendent.

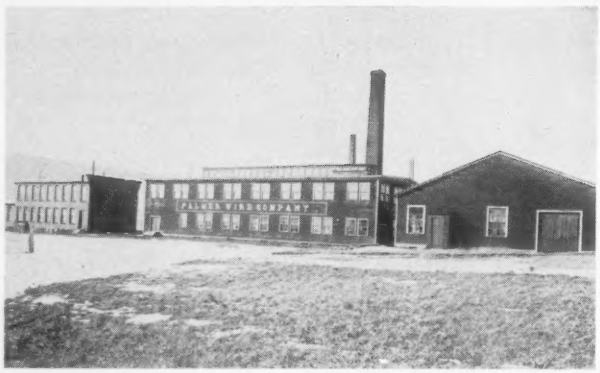
* * *

I wonder how much of Mr. Oakes' odd conduct was due to a project that was taking form at this time in the mind of one of the Wright wire rope salesmen. **Harry Black,** formerly with Page of Monessen, who had the oil-well territory, Oklahoma and the Southwest generally. He was (and is) an extremely able man, with a wide acquaintance among oil men, and at this time he secured the backing of the Sinclair and Doherty interests and planned a steel plant and rope



A Group Outside the Palmer Plant in 1904.

* * * * *



The Palmer Wire Co. in 1886, just before George F. Wright took it over. The looms are in the brick building on the left. The Palmer Plant of Wickwire-Spencer now occupies this site. * * * *

mill to be located at Kansas City. As this was clearly a Wright "puppy," let us deal with it briefly here. There was an electric furnace for the remelting of local scrap, which was cast into 4" ingots which were in turn broken down on a small three-high mill and fed at once to the rod mill. The latter, by **M. H. Treadwell**, was an open type with loops under fair control, with the special feature that the stands were in pairs with twist guides within the pair, so that while the ovals were always closely guided, the sections running to the repeaters were always diamonds.

* * *

THE project as a whole did not work out well. These small ingot project look well on paper, but for a combination of reasons too involved for discussion here they do not click. The steel in this case behaved badly in the rod mill and in the wire mill. As for the rod mill itself, it was ingeniously planned, and it had its defenders, but it has left no imprint on rod rolling practice. After a long period of disuse it was sold to a Mexican mill in 1929, where, after many vicissitudes, it settled down to the rolling of those 3/8″ rods which, through a curious set of circumstances which developed under my eyes, and which I shall explain some day, are the standard and the curse of Mexican wire practice. The wire mill later fell into the hands of a group of old Roebling men, **Bill Ensinger** and the **Voigtlander brothers**, Walter and Curtis, and much enlarged, is now prospering under the name of **Union Wire Rope Co.**

* * *

HOW does this affect Colin Oakes? Why, he went off to Kansas City with Harry Black to be superintendent of the wire mill. Another Worcester boy well known in the wire field was there, **Stanley Hunt**, who later came back and served as assistant superintendent at Palmer under **Carl King**, and later represented **Wickwire-Spencer** as Salesman in the Syracuse area.

* * *

IN the mean time we have left Mr. Lauren superintendent at Palmer, where he soon found himself involved in a bitter strike with which, with his blunt forthright methods he was ill-fitted to cope, and which confirmed him in the opinion that management was not his forte. At this time business was feeling the quickening effect of the first world war, of which we were still mere spectators, and Mr. Wright conceived the idea of installing at the Palmer site a wire rod mill, break-down facilities, and open hearth furnaces. A Worcester engineer, was put in charge, and in 1916 the motors, gears, and roll housings were beginning to come along. Mr. Wright asked Lauren where he could find a good man to engineer the steel furnaces, and the latter suggested a young man whom he had worked with at Roebling's an engineer who had overseen the building of the steel plant there and had stayed to operate it. His name, **Clarence Arms**, Mr. Wright sent for him, liked him, hired him.

* * *

J. W. Lauren had an itching foot. He took a few weeks off at this time to visit his native Finland, and never came back. Long afterward it was found that he had gone to Dixon Illinois to build and install wire equipment for **Reynolds Wire Co. Fritz Lindstrom**, whom he took with him from Palmer, and who stayed a couple of years in the west, is now superintendent, in Palmer, of the mill he left, as a wiredrawer in 1915. As soon as it became clear that Lauren was out, Arms was made superintendent, and the steel project was shelved.

* * *

ANOTHER incident contributed to delay on the steel project. This and other expansion plans called for a bond issue. The brokerage firm chosen to place the bonds brought to Worcester and Palmer a large party of salemen who where slated to handle the securities. They made plant inspections, dined and wined, and got themselves into position to push the stuff with intelligence and enthusiasm. Among these salesman was one **George Naphen**, a name which has been mentioned in the prayers of more widows and orphans than any since Jim Fiske. Naphen was a Worcester boy, once a page at the Worcester

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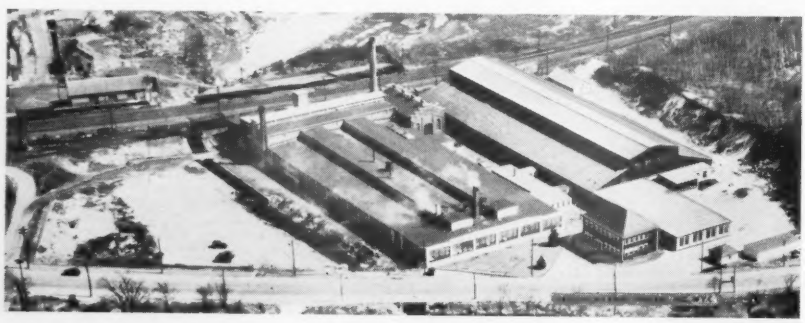

G. F. Wright Wire Company, Stafford St., Worcester, Mass. * * * * * *

New Developments in Tungsten Carbide

by A. R. Zapp, Carbide Products Manager
Firth-Sterling Steel & Carbide Co.
McKeesport, Pa.

A paper presented at the Los Angeles, Regional Meeting of the Wire Association at the Biltmore Hotel in Los Angeles on June 6, 1947.

TODAY'S widespread industrial applications of sintered carbide are the result of continuous developments since the introduction of this metal in 1929. As a result, outstanding applications in the die field today are wire-, bar-, and tube-drawing dies, tube-drawing mandrels, spring-forming tools, cold-heading and extrusion dies and related tools for bolts, deep-drawing and eyelet dies, compacting dies and punches, cut-off knives and quills, nail dies, coating dies, bushings, coils, and a great variety of specialties. The more simple applications developed easily; others required time-consuming changes in the metal, die construction, die-blocks, and operating technique. Today, many of the dies for these applications have reached the simplified stage of being metallurgically and dimensionally standardized, while others are readily specified to meet the individual requirements. While the field of development is considerably narrowed as a result of past developments, new applications continue to appear. With past experiences on applications bearing resemblance to new ones, the task of judging practicability and providing recommendations is somewhat simplified and yet there are frequently problems that stump the experts before some simple and then obvious means is discovered. Some new applications are confronted with a number of problems that make the application a doubtful one. Nevertheless, it is not wise to say offhand "it can't be done" as some inquisitive individual almost certainly comes along and does it. This can be an embarrasing situation, needless to say. Much credit must be given those users whose persistent efforts have tracked down detrimental factors, the elimination of which means another successful job. Without this kind of assistance based on logic, experience, and knowledge gained from daily contact with the job, many applications would progress slowly or fall by the wayside either permanently or for considerable delay until someone revives it and brings it to a successful conclusion. An example of this kind of cooperation and a discussion of a few recent developments follows.

* * *

AN interesting development in the hot compacting of a phenol-aldehyde compound emphasizes the importance of (1) proper carbide grade selection and (2) the necessity of conducting away heat causing excessive temperatures affecting proper operation. For some time, solid tungsten carbide compacting dies have been extensively applied to this job and no difficulties were encountered with the usual grades or with the heat envolved. The compacting temperature is 300°F. The part formed is a tube, the I.D. of which is formed on a solid tungsten carbide punch. The first experimental punches did not perform satisfactorily because the product would stick to the punch and in stripping would flare out excessively resulting in producing a tube that was not only shorter than that permissible but also had a large flash on the end where the stripping pressure was exerted. Believing that other grades of lower cobalt binder content might be the answer, the original grade having been a 13% straight tungsten carbide grade, two other grades were tried, one being a tungsten-tantalum carbide grade of 8% cobalt binder and the other a 3% straight tungsten carbide grade. The lower binder grade performed no better than the original grade. Various finishes were then tried, such as polishing axially instead of circumferentially as on the original punches but no improvement resulted; the same was true of a good lapped finish without polishing. The matter lay dormant for several months and was again revived after a further discussion between our sales representatives and the customer's engineer-in-charge and it was decided to investigate what temperature differential might exist between the tungsten carbide punches and the steel punches using the same mounting as was used with the steel punches in the belief that sticking might result if excessive temperature develops in carbide punches. By means of calorimeter tests simulating operating conditions, it was found that the temperature of the tungsten carbide punch rapidly built up to 100° hotter than that of the nitrited steel punches used. It was then obvious that it is neccessary to conduct away the excessive heat built-up in the carbide punch so a copper plug was installed in the usual steel holder and fitted so that the end of it contacted the end of the tungsten carbide pin which was only 3/32" diameter. Under actual operating conditions, the punch with this new style holder performed entirely satisfactorily.

* * *

THIS construction then permitted investigating the wear resistance of the three grades supplied for these punches. The criterion of wear resistance was that the radius

on the end of the punch must not wear beyond a certain maximum radius starting from a small radius of about .010". The 13% binder carbide wore oversize after 13 hours. The 8% binder tungsten-tantalum carbide grade ran 32 hours after which it broke due to an accident resulting from an inherent characteristic of the press. However, this grade began to show signs of wear. The 3% binder straight tungsten carbide punches first tested ran 90 and 180 hours each with slight repolishings after each 24 hours and were also broken due to an accident but subsequently another punch in the same grade ran 540 hours with only slight servicing attention every 24 hours for repolishing. The radius had hardly started to wear at that stage and it is estimated that the life would be 1,000 hours barring accident.

* * *

TODAY, this operation is considered entirely satisfactory. By comparison with the two hour life of nitrited steel punches, tungsten carbide punches offer obvious operating advantages.

* * *

IT is interesting to note that the successful development of this application did not come about immediately and was effected largely through the customer's dogged effort to successfully develop it. This kind of customer assistance in the development of new applications is invaluable and in a number of cases has meant the difference between success and failure. Many times, the problems of initial unsuccessful efforts on new developments are placed in the carbide die supplier's lap with a "produce or else" attitude with the result that considerable time and effort have to be applied which detracts from the effective handling of routine problems that arise and can be handled from past experiences whereas the user is in the best position to eliminate one by one the various detrimental factors until successful performance obtains. It has been our experience that best results obtain when the user whole-heartedly endeavors to solve whatever problems might arise.

ANOTHER application which offers considerable promise is the hot extrusion of aluminum and other metals in temperature ranges of around 800-900°F. The work conducted to date is still in the early stages but the results indicate that the application is practicable. One die, before being accidentally damaged, produced 5 times as much as the equivalent steel die. The surface finish on the product which was a tube 2-5/8" diameter had a highly burnished finish which was as good at the end of the run as when the die was first installed. No size loss developed. The die consisted of a tungsten carbide ring fitted to a suitably heat-treated steel casing using a very simple construction. No service attention involving repolishing or cleaning the die was required. While the work is still in the early stages, as stated above, it is felt that this application shall eventually become a common one.

* * *

DEVELOPMENT work on tungsten carbide dies for higher temperature extrusion such as on brass at around 1600°F is in the offing. It is understood that considerable success is being enjoyed in Europe on carbide dies on this application.

* * *

WHILE on the subject of hot work, it might be interesting to note the effect of heat on tungsten carbide. It is commonly known that excessive localized temperature will cause cracking in the form of a network of numerous fine cracks penetrating from the surface. These cracks may penetrate eventually entirely through the wall thickness of the metal with subsequent applications of loads or may abruptly turn and connect with adjacent cracks with the result that a flake of carbide will become detached from the active surface. The direction a crack follows in a hard metal is almost unpredictable and can be readily visualized by comparison with a crack in a flat glass plate and noting that the crack may propagate in almost any direction with slight application of load. The crack also propagates very rapidly because the stress concentration at the end of the crack is extremely high. Consequently, once a crack starts to develop in a hard metal such as tungsten carbide, it does not take too long, depending on the application, before it has developed to such an extent as to be detrimental to the further operation of the die.

* * *

HIGH localized temperature in the die is a common cause of failure by cracking and may result from (1) faulty grinding, (2) faulty lubrication, and (3) high operating temperatures.

* * *

WITH regard to the first point, faulty grinding, it is well known that the use of improper grinding wheels and attendant development of excessive heat results in a network of heat checks. The same has been found to be true in wire- and tube-drawing as the result of faulty lubrication. With regard to high operating temperatures, we had occasion to attempt to draw 105 mm shell forgings in a tandem five die horizontal press during the war. The temperature of the forgings was 1800°F. The tungsten carbide die was used as the final or sizing draw after 4 preceding draws on steel dies. Fine checks developed after about 20 pieces and, after about 70 pieces were drawn, it was necessary to remove the die on account of large flakes having pulled out as a result of crack propagation as described above. Conversely, a hot heading application was recently successfully performed on a tungsten carbide heading die with the toughest grade of tungsten 64-66C. This die was used for upsetting the collar on a 5/16" diameter steel rod which was also bent at 90° to the portion in the hole in the die. The die also had a pointing angle for forming the point or chamfer on the portion in the hole in the die. The job was completed at 65,000 pieces and the die had worn only very slightly in the region of the mouth, being otherwise unaffected. Incidentally, even at the low production obtained when the order expired, the die cost per 1,000 pieces

was $2.00 whereas on steel dies the die cost was considerably higher.

* * *

IT is apparent that influencing factors in hot operations are time, temperature, and pressure. In the case of hot heading the steel shaft referred to above, the temperature was well over 1300°F, the pressure was appreciable, but the time of engagement in the die was only one second. Consequently, there was not much opportunity for heat transmission from the product to the die. In the case of the hot drawing of the 105 mm shell forging, the temperature was not only very high but the pressure was high and the length of engagement in the die was great enough to permit considerable heat transmission to the die as was evidenced by the temperature of the die when it was removed from the press. In the case of hot extrusion of aluminum, the pressure is high, the length of engagement is high, but the temperature apparently is not excessive. Furthermore, the operation is well sealed with the result that no atmosphere is present in the region of the active surfaces of the die to cause oxidation of the cobalt binder which otherwise might result after a rather long period of time at the elevated temperature used. Such oxidation would cause eventual wear of the die. In the case of faulty lubrication in tube- and wire-drawing, the time is lengthy, the pressure is heavy, and from all indications the temperature developed is very high with the result that carbide dies can readily break down as a result of improper lubrication.

* * *

WITH these factors in mind, some guidance is available in estimating the practicability of similar applications.

* * *

ANOTHER relatively recent development is that of tungsten carbide deep drawing dies for drawing cups, whether ferrous or nonferrous, from discs. One successful application is that of drawing a low carbon steel domed cup measuring 6-1/4″ diameter x 5-3/4″ high, 1/8″ thick wall, from a 15″ diameter disc. This is obviously a severe draw, the length of the cup being almost the same as the diameter and the circumference of the disc being reduced from 47.1″ to that of the cup, 19.6″. The die consisted of a tungsten carbide ring shrink fitted to a steel casing, the top face of which was polished and hardened to 58-60 RwC. The hardened steel face provided the necessary wear resistance to the wrinkling action of drawing and this, coupled with the low frictional resistance of tungsten carbide in sizing the O.D., no doubt permitted this severe draw. To date, 250,000 cups have been drawn and the die shows no signs of wear on either the I.D. or the top face.

* * *

BLANKING and cupping dies for double-acting presses have also been applied, largely on steel up to 1/16″ thickness. Requisites of this type of die are (1) a hardened outer edge for blanking, (2) a hardened face to resist wear due to wrinkling in drawing from disc to cup, and (3) a hardened internal drawing surface. One construction calls for a chrome steel casing hardened throughout to provide the hardness required for the blanking edge and top face, and a tungsten counterbore for I.D. wear resistance. carbide draw ring fitted in a suitable Another construction consists of a steel casing with hardened top face and tough core, a tungsten carbide ring fitted internally for I.D. wear resistance, and either a tungsten carbide or chrome steel ring fitted externally for blanking edge wear resistance. Steel blanking edges normally produce about 100,000 pieces per grind and inasmuch as it is good practice to repolish a carbide draw die at this stage, the blanking edge can be readily restored at the same time with the removal of not more than .010″ stock from the top face.

* * *

AT the present, tungsten carbide blanking edges have been used for stock up to 1/16″ thick. In the case of those double-acting dies having thin walls precluding the use of the construction where a carbide ring may be shrink fitted into a steel casing having a suitable outer blanking edge, such dies would have to be made of solid carbide and consequently should be given careful consideration from a standpoint of whether or not the internal pressures induced would be great enough to cause failure as a result of the characteristic weakness of carbide in tension. If the gauge of metal is light, if the metal is readily drawn, and if there is clearance between the punch and die over and above that of the thickness of the metal to be drawn, certain applications may be found to perform satisfactorily. However, not an extensive amount of work has been done on the latter type of dies because many of them appear to be of an extremely questionable nature because of the apparent heavy internal pressures induced.

* * *

In the nail industry, cut-off knives are gradually being brought up to the point of attractive production. It is not now uncommon in a certain few mills to find average production of around 350 hours per redressing. In one case, a pair of nail knives reached a production of 1300 hours with 3 redressings. This, again, is a relatively recent development requiring the application not only of the proper grade of tungsten carbide but also of careful attention on the part of the user. As related above, best results today are being obtained in those mills where careful supervision exists and full cooperation on the part of the user is exerted. With the development of suitable redressing equipment which is now under way, we feel that it will be only a matter of time until appreciable success shall be enjoyed on knives. The same is true of heading hammers for nail machines. In one case, a tungsten carbide heading hammer for roofing nails ran 2600 hours with 5 redressings in that time, after which the shank failed in the region of the insert although the insert suffered no damage and could readily be fitted to another shank The use of tungsten carbide on nail hammers is desirable from the standpoint of minimizing the blemish that readily appears on the head of a nail as

(*Please turn to page* 612)

LABOR RELATIONS

by John B. Stone,
Washington, D. C.

The fourth of a series of articles on the subject, with particular reference to problems of the wire and wire products industry. The author is a noted authority on the subject.

DEVELOPMENTS since the passage of the Taft-Hartley Act over a presidential veto point to one conclusion of utmost importance to the labor relations of all manufacturers, including wire and wire products producers.

* * *

THAT fact is this — actual relations between plant owners and leaders of plant employees will be determined to a much greater extent than any previous time since passage of the Wagner Labor Relations Act by the desires of those actually involved in negotiations.

* * *

IN other words, if plant managers and labor leaders both want to get along on some basis acceptable to both, they can do so with a minimum of governmental interference.

* * *

ON the other hand, if either side prefers a fight now to establish a long labor relations pattern more to its liking the new law affords almost unlimited avenues through which negotiations can be delayed through labor board hearings and appeals to state and federal courts.

* * *

THE possibility for establishment of peaceful relations comes more through actions of the big labor unions since the new labor bill became law than through any provisions in the bill itself.

* * *

JOSEPH A. Padway, chief counsel for the American Federation of Labor, after consultation with attorneys for nearly 100 of the AFL international unions which comprise the federation set the pattern of procedure of these groups as follows:

(1) AFL unions (as CIO unions previously had decided) will flatly refuse to obey the provisions of the Taft-Hartley bill prohibiting expenditure of union funds on political activity. This has little direct significance for plant and factory labor relations.

(2) Most AFL unions will flatly refuse to sign and present to the newly constituted National Labor Relations Board certificate declaring that none of the union officers is a member of or sympathizes with the Communist party.

(3) Most of the powerful well established AFL unions such as the United Mine Workers, the Carpenters, the International Brotherhood of Electrical Workers and other members of the building trades unions will flatly refuse to sign contracts including a "no-strike" pledge until the provisions of the Taft-Hartley Act banning the "closed shop" have been erased from the state books. And,

(4) Many of the biggest AFL unions, again including the Mine Workers, possibly the powerful Teamsters union and others will by-pass the new National Labor Relations Board entirely, preferring to setle their own labor problems in direct negotiations with employers without Governmental interference.

* * *

THE AFL decision to fight the provision outlawing unions which have Communists or Communist sympathizers among their officers is of more concrete importance to wire manufacturers and processors than may appear at first glance.

* * *

SIGNIFICANTLY, it was the AFL which spoke first on this issue. The AFL has few Communists in key positions and has been clamoring as loudly and as persistently against Communist influence in the labor movement as any employers association.

THERE is no question but that the AFL decision was made in its own selfish interests and not to protect any Communist or Communist sympathizer within its ranks. For one thing, the AFL attorneys were convinced that the clause would be used not only against followers of the Moscow party line but against any labor leader who might incur the displeasure of company management. Though Padway doesn't admit this publicly, labor observers are convinced that that was one of the prime motives behind the decision.

* * *

BUT of equal importance is the position in which Philip Murray and the CIO leadership is placed by the AFL decision on this point. It is an open secret in Washington that Murray, and those around him, regarded the anti-Communist provision as the one bright spot in the Taft-Hartley legislation. It gives them a powerful weapon in battling the left wing leadership of some CIO unions, particularly the United Electrical, Radio and Machine Workers.

* * *

DISCONTENT among the left wing CIO leaders has been growing by leaps and bounds since the last CIO convention and Murray's advisers had hoped that the Taft-Hartley bill would give them an opportunity to end the disquiet by getting rid of the disgruntled "red" leaders.

* * *

BUT the rapid about face by the AFL attorneys complicates this plan. If Murray attempts to get tough, now, with left wing leaders

(*Please turn to page* 608)

GOVERNMENT WIRE PRODUCTION INFORMATION

Report on German Brake Lining Industry

GERMAN friction brake linings were made with a strong zinc alloy wire reinforcement according to a report on German asbestos products now on sale by the Office of Technical Services, Department of Commerce. The zinc alloy wire was appreciably stronger than the pure zinc wire familiar to the British investigators who studied this industry.

* * *

THE report, covering 10 manufacturers of asbestos textiles, gaskets and friction linings, was prepared by the British Intelligence Objectives Sub-Committee.

* * *

THE zinc alloy wire used in woven brake linings contained 1.1. per cent copper 0.8 per cent aluminum and traces of iron, lead and chromium. The alloy has higher tensile strength than pure zinc but is somewhat less ductile.

* * *

GERMAN brake linings were in general found inferior to American and British products. Because of the wartime shortage of long staple asbestos, most linings were molded with phenol-formaldehyde resins or with buna rubber. In addition to short staple reclaimed asbestos, filled materials included cellulose fibers, slag wool, glass silk, steel wool and brass and other metal particles. Aircraft brake linings were usually molded of steel wool and buna rubber. No wartime substitutes were considered equal in performance to friction linings made of long staple asbestos.

* * *

THE British investigators were not impressed by the quality of the high pressure gaskets seen in five of the asbestos firms visited. Formulas for most of these gasket materials are included in the report. A certain amount of natural rubber was put into almost all compounds, in spite of Germany's severe wartime shortage. Other ingredients used included buna rubber, asbestos of various qualities, barytes, sulphur, magnesium oxide, zinc oxide, etc.

* * *

GERMAN experts had high regard for a spun glass as a substitute for asbestos in heat insulation and electrical insulation tapes. Production was highly developed, according to the investigators. Standard types of spinning and weaving machinery were employed. Flyer spinning was generally used for coarse yarns and ring spinning for finer types. High speeds were achieved in weaving, one plant operating at the rate of 220 picks per minute. Among other substitute insulation textile materials were cellulose, peat fiber, slag wool and rock wool.

* * *

MICROMETER PRECISION

MICRO-WELD

TRADE MARK REG. U. S. PAT. OFF.

MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation on high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light, extension cord, and mounted on a 4-wheel truck. Special units can be furnished for crane mounting.

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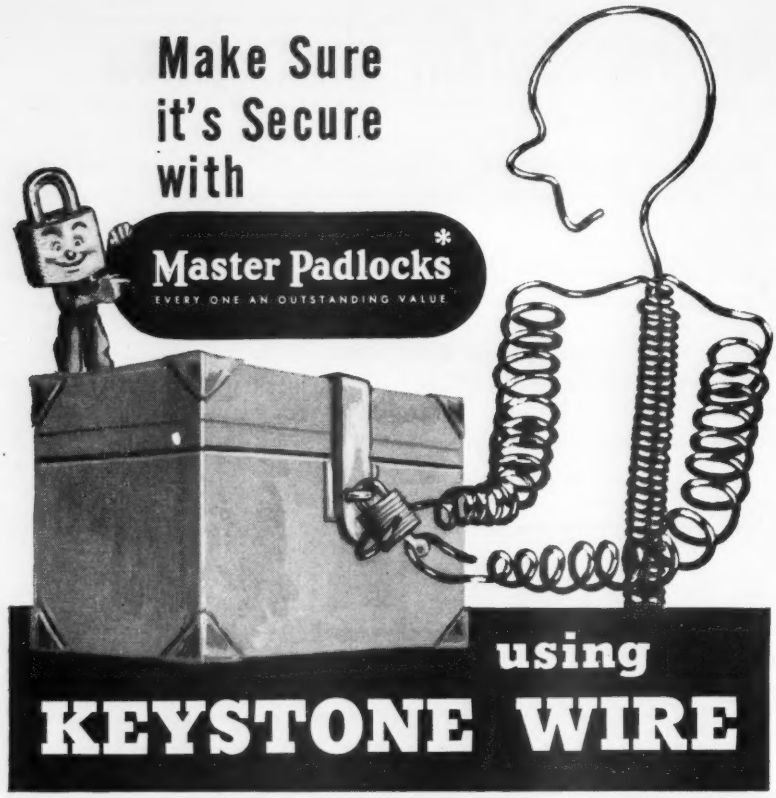

Master's famed No. 5 lock — the biggest and huskiest of them all!

A padlock can be no stronger than its case, no safer than its locking mechanism . . . and Master padlocks score on both counts.

The Master case is constructed of strong steel plates, laminated together under pressures up to 300,000 pounds, and securely riveted. The inner-workings are equally well made. Husky levers, precision-built brass cylinders, "taper round" nickel silver pin tumblers and a whole series of built-in security devices are all additional reasons why lock experts specify Master padlocks.

We are proud that Keystone wire of special analysis finds its way into important parts of these high-quality padlocks. Whatever the wire need, Keystone can normally supply it.

* *Master Lock Company, Milwaukee, Wis.*

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SPECIAL ANALYSIS WIRE
for all industrial purposes

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ORDERS for the report **(German asbestos textile, jointing and friction lining industries:** PB-63873; photostat, $3; microfilm, $1; 36 pages) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Temper Brittleness in Steel

WIDELY accepted explanations of the nature and causes of temper brittleness in steel may be incorrect according to an American wartime research report now on sale by the Office of Technical Services, Department of Commerce.

* * *

CONTRARY to popular belief no conclusions are yet justified as to the effect of steel making practices on the extent or rate of the temper brittleness transformation, the report states.

* * *

THE report, prepared by Capt. John H. Hollomon, Ordnance Dept., U. S. Army, for the Watertown (Mass.) Arsenal, surveys the available information on temper brittleness in steels. The main subjects covered are:

(1) The effect of the temper brittleness transformation on tensile, impact and other physical properties and on metallurgical structure.

(2) The effect of variables, including time and temperature of transformation; structure; composition, with particular reference to plain carbon steels and to other components such as manganese, chromium, nickel, molybdenum, carbon, phosphorus, oxygen and nitrogen; and forming, casting and refining practices.

(3) The nature and effect of precipitation in the mechanism of temper brittleness.

* * *

ALTHOUGH the vital importance of the temper brittleness problem in the developement of better ordnance material was widely recognized as early as World War I, britleness still limits the maximum hardness which can be obtained in

heat-treated steels thicker than two inches without loss of impact properties, the report points out.

* * *

MUCH was learned between the two world wars concerning the transformations which occur in steel during heat treatment, Capt. Hollomon states in a foreword to the report. Older theories of temper brittleness must be re-evaluated as a result of new findings. The preponderance of data indicates that explanations based on phase transformation other than a simple precipitation are untenable.

* * *

Savings in Electrode Life

THE Japanese ferroalloy industry effected appreciable savings in electrode life by wrapping thin sheet iron around the electrodes to minimize oxidation losses caused by hot gases and flame while smelting, according to a report on Japanese ferroalloy metallurgy now on sale by the Office of Technical Services, Department of Commerce.

* * *

THE 52-page report, prepared by the natural resources section of General Headquarters, Supreme Commander for the Allied Powers in the Pacific, is a detailed review of the Japanese ferroalloy industry, including metallurgical practices, raw materials sources, standard specifications and production data.

* * *

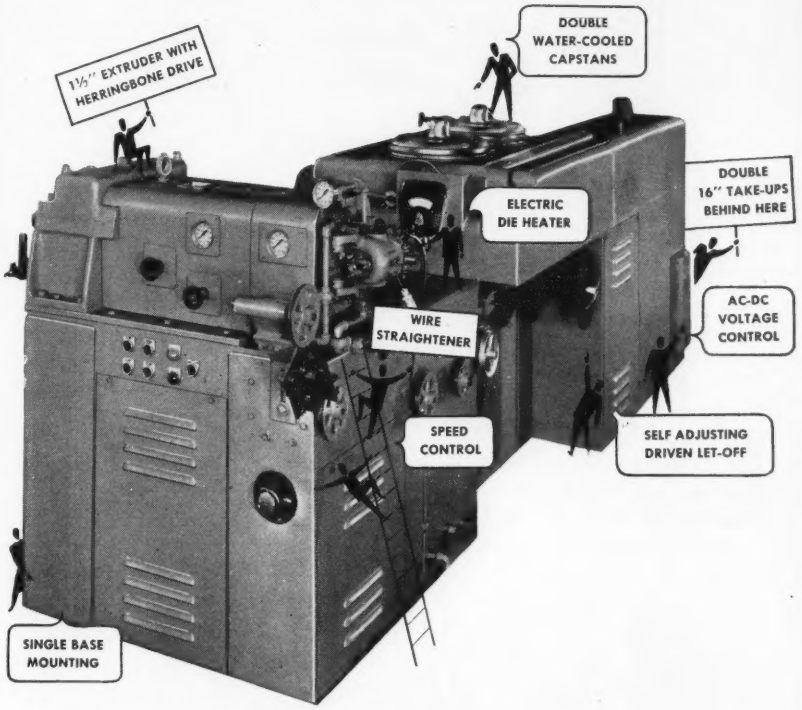
JAPANESE metallurgical technology and electric furnace equipment were copied from foreign countries, particularly the United States and Germany, the report points out. The application of technical knowledge to actual operational practice, however, was below the standards copied. American observers noted especially the lack of labor saving devices, general inefficiency, and waste of raw materials, fuel and power.

* * *

ALTHOUGH the better Japanese metallurgists seem to understand the theory of ferroalloy smelting, poor use was made of their

Anyway you look at it...

This 1½" (NRM) Wire Covering Unit Sparkles With Features



SPACE here is too limited to completely describe the unit above. But you can see for yourself... its clean, compact design... only 13 feet long. What you can't see is its versatility... its great performance on smaller diameters of wire at speeds up to 800 feet a minute. If you want to add a great little unit to your wire covering capacity, you'll need more information of course... just drop us a line, today.

NRM

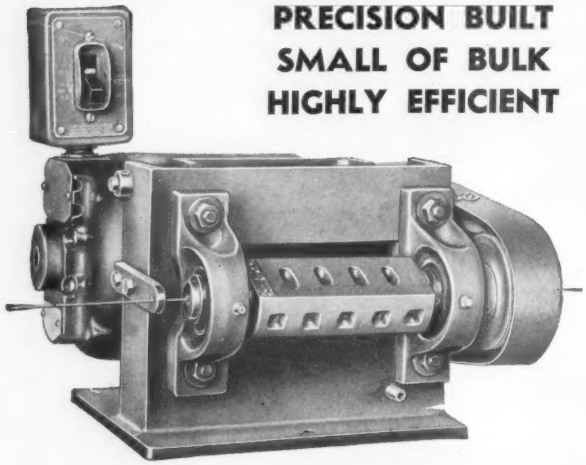
Plastics Machinery Division

NATIONAL RUBBER MACHINERY COMPANY

AKRON 8, OHIO

New Completely Motorized ROTARY STRAIGHTENER

PRECISION BUILT
SMALL OF BULK
HIGHLY EFFICIENT



FULLY and accurately motorized. Very compact, and so free from vibration it can be operated on the bench without being bolted down. The speed is high, and is predetermined for the wire to be handled; yet operator can easily vary the speed by merely altering the motor sheave. Comes complete with switch — nothing to do but connect it into the power line. Marks a happy ending to heavy, bulky, inefficient motorizing!

As always, a similar straightener (see below) is available without motor.

STANDARD TYPE — Nonmotorized

THE F. B. SHUSTER MFG. CO., INC., NEW HAVEN, CONN.
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SHUSTER SINCE 1866

Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

knowledge in actual plant operations, according to the report.

* * *

THE metallurgical processes described are incomplete in some details. They cover the ferromanganese group, ferrosilicon, high and low carbon ferrochrome, chrome silicide, ferrotungsten, ferrophosphorus, ferromolybdenum, ferrovanadium, ferrotitanium, ferronickel, ferrozirconium and metallic silicon.

* * *

THE report also describes Japanese electric furnaces, furnace linings and electrodes. The use of sheet iron covers to conserve electrodes is mentioned, but no additional details are given.

* * *

New Book Covers Foreign Contracts

HOW American business concerns can consolidate their facilities and organizations to meet foreign trade competition without violation of the Anti-Trust laws is explained and documented in a new book, "International Contracts and the Anti-Trust Laws", by **Harry Aubrey Toulmin, Jr.**, of the Bar of the Supreme Court of the United States and president of The Hydraulic Press Manufacturing Company.

* * *

THE negotiation and drafting of international contracts is an art, Toulmin points out. Eighteen essential factors to be considered in such contracts are developed in the book.

* * *

TYPICAL forms of agreements, indictments, complaints, and decrees, together with the full text of all related anti-trust laws, the Webb-Pomerene Export Trade Act, and coordinate and related acts are included in the book's 1068 pages. Published by W. H. Anderson Company, Cincinnati, the price is $15.

An ADVERTISER likes to know his ads have been read so please mention WIRE & WIRE PRODUCTS when writing him.

Outstanding Personalities of the Wire Industry

Jones & Laughlin Steel Makes Changes In Sales Personnel

A. J. **Hazlett,** vice president and general manager of sales, **Jones & Laughlin Steel Corporation,** announced the following personnel changes:

* * *

D. W. **Thomas,** manager of sales, tin mill products, has been appointed assistant general manager of sales; **J. E. Timberlake,** manager of sales, wire products, has been appointed assistant general manager of sales; **J. O'H. Anderson,** assistant general manager of sales, has been appointed district sales manager, New York District sales office; **S. A. Fuller,** district sales manager, New York District sales office, has been appointed manager, Market Research Department; **Howard A. Knox,** assistant manager of sales, tin mill products, has been appointed manager of sales, tin mill products; **C. E. Kendall,** assistant manager of sales, wire products, has been appointed manager of sales, wire products and **D. J. Henecker,** assistant manager of sales, wire products, has been appointed manager of sales, wire rope products.

* * *

Richard K. Lee Appointed Technical Director of Alloy Rods Co.

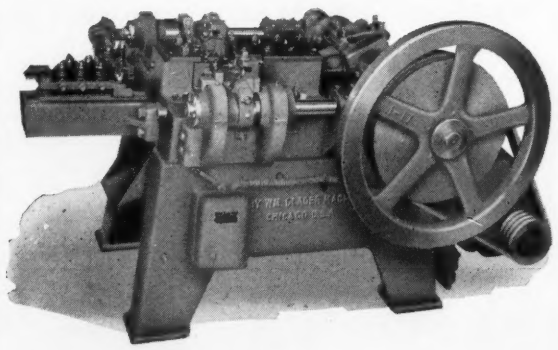
RICHARD K. **Lee** has been appointed to the position of technical director of the **Alloy Rods Co.,** York, Pa. He had been research assistant and research engineer on slags, steel melting practice and nonmetallic inclusions in steel at the Steel & Tube Division of the **Timken Roller Bearing Co.,** Canton, O. During the last six years, his work has been research engineer on arc welding electrodes, welding metallurgy and electrode production quality control.

Pollock Made Production Manager of all Allegheny-Ludlum Production Operations

CARL B. **Pollock,** manager of the Brackenridge, Pa., plant of the **Allegheny-Ludlum Steel Corp.,** has been appointed production manager. Mr. Pollock will serve as assistant to the production head, and will correlate the production of company plant and manufacturing facilities. He also will have general supervision of scheduling and be in charge of customer relations from the standpoint of production. He is succeeded by **George W. Evans,** veteran employee who had been assistant plant manager. Mr. Evans has been with the company since 1909. Since that time, he has worked in most departments of the plant, having been made assistant plant manager in 1944.

* * *

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

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Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

American Rolling Mill Appointments

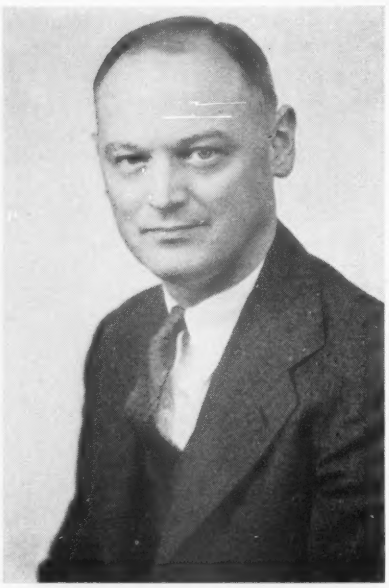
CHARLES R. Hook has been elected president and chairman of the executive committee and **Calvin Verity** as chairman of the finance committee of the **American Rolling Mill Co.**, Middletown, Ohio, Also **W. W. Sebald** has been elected executive vice-president; **R. L. Gray, F. E. Vigor, J. A. Ingwersen** and **C. H. Murray**, vice-presidents; **H. H. Tullis**, vice-president and controller; **W. D. Vorhis**, secretary; and **F. D. Danford**, treasurer.

* * *

K. U. Wirtz Elected President The Electric Furnace Co. Salem, Ohio

K. U. Wirtz, formerly Executive Vice President of **The Electrical Furnace Co.**, Salem, Ohio, was elected President of the Company at a meeting of the Board of Directors held at the Company's offices in Salem, Ohio recently. The appointment fills the vacancy created by the recent death of Mr. R. F. Benzinger.

* * *



K. U. Wirtz, President, Electric Furnace Company, Salem, Ohio. * * * *

MR. Wirtz, a graduate of the Case School of Applied Science, joined The Electric Furnace Company organization in 1927, as an Erection Engineer. He has served in various capacities including that of Chief Estimator, Sales Engineer and Assistant Secretary before being advanced to the office of Executive Vice President, in 1946.

* * *

THE present officers of the Company are:

K. U. Wirtz, President; F. T. Cope, Treasurer; C. L. West, Vice President; C. H. Vaughan, Ass't Vice President and R. D. Painter, Secretary.

* * *

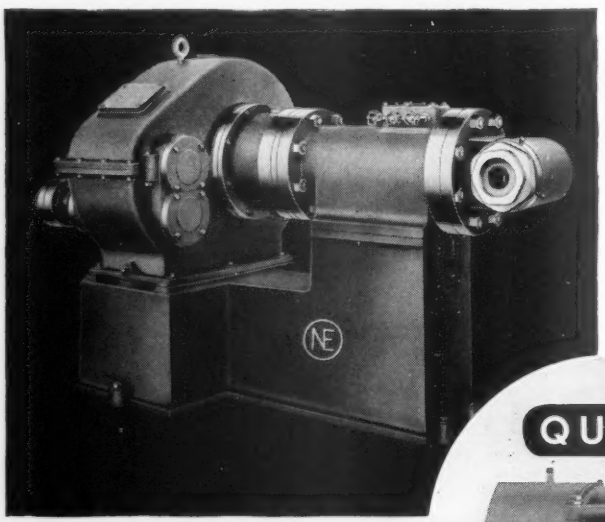
THE Board of Directors consist of:

Chairman; K. U. Wirtz, A. J. Hoiles, Ralph S. Tyler, Jr. and R. D. Painter.

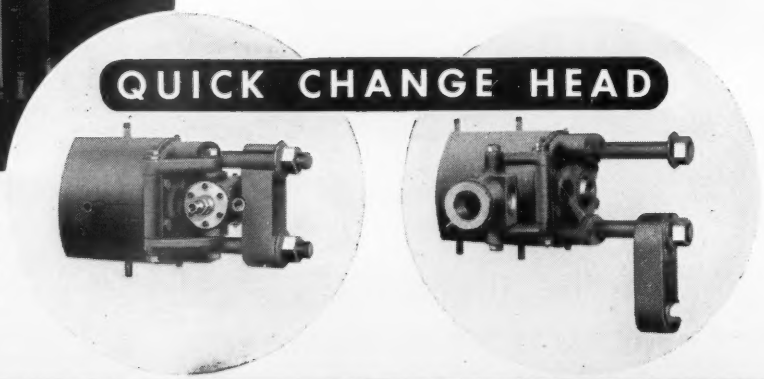
* * *

New INCO Appointment

WAYNE Z. Friend has been appointed Assistant Section Head of the Corrosion Engineering Section of the Development and Research Division of **The International Nickel Company, Inc., T. H. Wickenden**, Manager of the Division, announces.



NE TUBERS *adaptable to* **variety of products. Illustrated at left is a 4½" NE tuber equipped with cross-feed flanged-type head for insulating wire, extruding hose covering, special shapes or tubing. With slight modifications, either rubber or plastics can be handled.**



NE Quick Change Head Unit permits swinging Die Head out, for cleaning, inspection or changing. Just loosen 2 bolts. This feature illustrated on a 3½" NE Tuber is available on all sizes thru 6".

NATIONAL-ERIE CORPORATION
ERIE, PA. U. S. A.

MR. Friend has been with the Development and Research Division of International Nickel in New York since 1937. After receiving the degrees of Bachelor and Master of Science in Chemical Engineering at West Virginia University, he became associated with the Development and Research Department of the Baltimore Gas Engineering Corp. at Charleston, West Va. From 1929 to 1937 he was successively District Manager and Chief Technologist of the Philgas Department of Philips Petroleum Company in Boston and Detroit.

* * *

Ralph D. Hindson Forms Engineering Firm

RALPH D. Hindson, who served up to recently as an engineer with the **Steel Company of Canada** at Hamilton, Ontario, has joined forces with **J. M. McDonell**, also an engineer, to form a new company to render consulting and sales engineering service.

THE new organization is called the **Metallurgical Sales and Service Company** and has its headquarters at 81 Hyde Park Avenue in Hamilton, where it will engage in the representation of both Canadian and U. S. manufacturers. Mr.

Ralph D. Hindson, Metallurgical Sales and Service Company, Hamilton, Ontario, Canada.

Hindson is a member of the Wire Association and will be remembered by those who attended the annual Convention last October in Buffalo for a fine presentation of a technical paper entitled: "The Manufacture of Steel for Wire Rope."

* * *

MR. Hindson is a graduate metallurgist of McMaster University and was with the Steel Company of Canada for nine years, where he held responsible positions in the Metallurgical, Open Hearth and Rolling Mill Departments. He is also a member of the A.S.M. and the A.I. & S. E.

* * *

MESSRS. Hindson and McDonell will be glad to extend their services to those American concerns who would like to do business in Canada and whose interests would be furthered through a connection that will provide competent contacts with their prospective customers in that country.

WEAN EQUIPMENT Corporation

THE WEAN EQUIPMENT CORPORATION are recognized as specialists in high-efficiency strip and wire mill equipment.

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GALVANIZING AND TINNING TAKE-UP FRAMES
WIRE FLATTENING · SPOOLERS
NAIL GALVANIZING AND BLUEING FIELD FENCE and BARBED WIRE MACHINES

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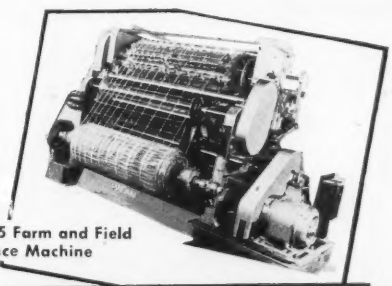
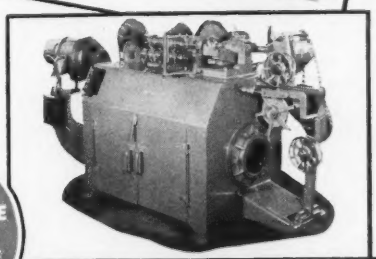
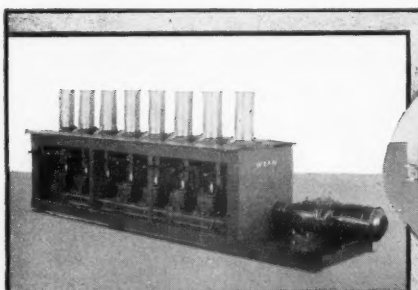


No. 1155 Farm and Field Fence Machine

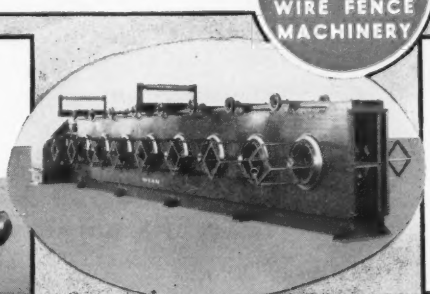


Barbed-Wire Fence Machine

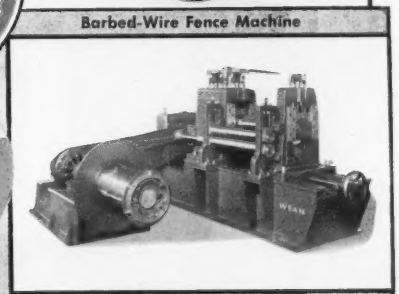
HOLMQUIST BARBED WIRE and WIRE FENCE MACHINERY



8 Black Fine Wire Tinning Take-up Frame



16 Block Wire Galvanizing Frame



Strip Reel and Slitting Unit

Crewe Heads Wire Company

LEONARD C. Crewe ("Red"), formerly Works Manager of Johnson Steel and Wire Company, has been elected President and General Manager of the **Maryland Fine and Specialty Wire Company**, Cockeysville, Maryland, located just outside of Baltimore.

* * *

"RED" first soaked up knowledge of the steel industry through association with the La Follette Coal and Iron Company in Tennessee, of which his father was president and general manager. His experience there led him to select the steel industry as his life work. He attended Lehigh University, from where he graduated in 1929, joining the Bethlehem Steel Company in the Open Hearth Department. Before taking up active duties, however, he spent several months in Europe studying iron and steel production in a number of plants.

* * *

IN 1932 he began his work in the Sparrow's Point wire mill under the guidance and direction of John Mordica, who made him first foreman of the Galvanizing Department and later general foreman of the Rod and Wire Mills. Upon the death of Mr. Mordica in 1937 he was made Assistant Superintendent, a position he held until he went to Worcester to Work for the Johnsons in February of 1945.

* * *

ASSOCIATED with Mr. Crewe in the Maryland enterprise are **John Zouck**, Vice President and Treasurer; **Elmer Leister,** Assistant Secretary; and **Robert Strobel,** Superintendent. Sir James Dunn, Chairman of the Board of the Algoma Steel Company, Canada, is one of the directors.

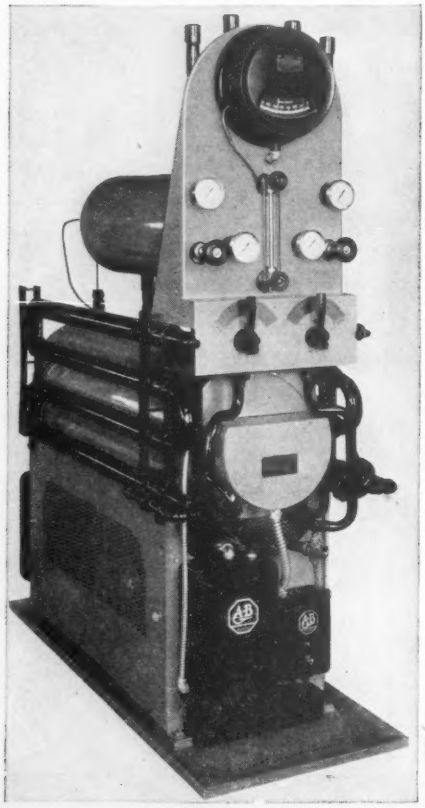
* * *

"RED" has the hearty good wishes of his friends in the wire industry and of the Wire Association officers and directors, to which latter body he was elected as a director last spring.

Colorado Fuel and Iron Corp. Appointments

NEWELL H. Orr has been appointed vice-president in charge of sales of the **Colorado Fuel & Iron Corp.**, Denver, and subsidiary companies. Mr. Orr has been in charge of western division sales and began his association with Colorado Fuel & Iron in 1935. Prior to that time he was connected with the American Bridge Co., Jones & Laughlin Steel Corp. and American Iron & Steel Institute. **William S. Boyce** has been appointed general manager of railroad sales for the Colorado Fuel & Iron Corp. At the same time **F. S. Jones,** formerly sales manager of wire products, was appointed general manager of commercial sales for the western division which includes the territory west of the Mississippi River.

* * *



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For Extrusion and Other Industrial Uses

A compact, simply operated unit designed to sustain any pre-determined temperature between 90°F and 475°F. — Hand-lever selection of desired temperature — Heat supplied — or drained — according to operational requirements — Formed piping, elimination of gaskets, and drip pans promote cleanliness — Breakdown of heat transfer oil reduced to a minimum — Three standard sizes 16KW, 32KW, 48KW — Other units with water circulation and refrigeration for operations requiring constantly maintained lower temperatures, 35°F to 200°F.

JOHN ROYLE & SONS ROYLE PATERSON N. J. 1880

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Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

A Review of Recent Wire Patents

No. 2,421,601, SEAM FOR WOVEN WIRE FABRIC, patented June 3, 1947 by Donald C. Dilley, Cleveland, and Robert R. McGregor, South Euclid, Ohio, assignors to The Lindsay Wire Weaving Company, Cleveland, Ohio, a corporation of Ohio.

Adapted for paper making machines, this fabric has a small deposit of fusible metal joining each opposed pair of warp pickets, the deposits being limited to these pickets and the area of the opening of the seam being the same as that between any two weft wires o fthe fabric.

* * *

No. 2,421,617, METHOD FOR REMOVING COATINGS FROM METALLIC CONDUCTORS, patented June 3, 1947 by Phyllis Holmes, Stretford, England, assignor to Metropolitan-Vickers Electrical Company Limited, a company of Great Britain.

For removing polyvinyl acetal resin dielectric material from wire conductors, the inventor immerses the wire in molten potassium iodide maintained at a temperature between 700° C. to 750° C. for a time sufficient to effect removal of the coating.

* * *

No. 2,421,672, RUST PREVENTIVE COMPOSITION, patented June 3, 1947 by Chester E. Wilson, San Pedro, and Mary Louise Dodge, Long Beach, Calif., assignors to Union Oil Company of California, Los Angeles, Calif., a corporation of California.

This inhibitor comprises between about 5% and 95% by weight of an oil-soluble metal soap of a semi-drying oil and between about 3% and 85% by weight of an oil-soluble metal soap of synthetic organic acids produced by the liquid phase oxidation of a petroleum hydrocarbon.

* * *

No. 2,421,743, METAL SCREEN, patented June 10, 1947 by William G. Cartter and Harold A. Duffy, Monrovia, Calif.

This screen includes a channel frame having straight side legs, a series of wire coil sections arranged parallel and in the same plane across the frame with their end portions confined in the channels of the frame side legs, and partitioning ribbons having channel-like portions disposed between the wire coil sections and partially confining the sections between adjacent ribbons.

* * *

No. 2,422,281, APPARATUS FOR INSULATING CONDUCTORS, patented June 17, 1947 by Robert T. Adams, Baltimore, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

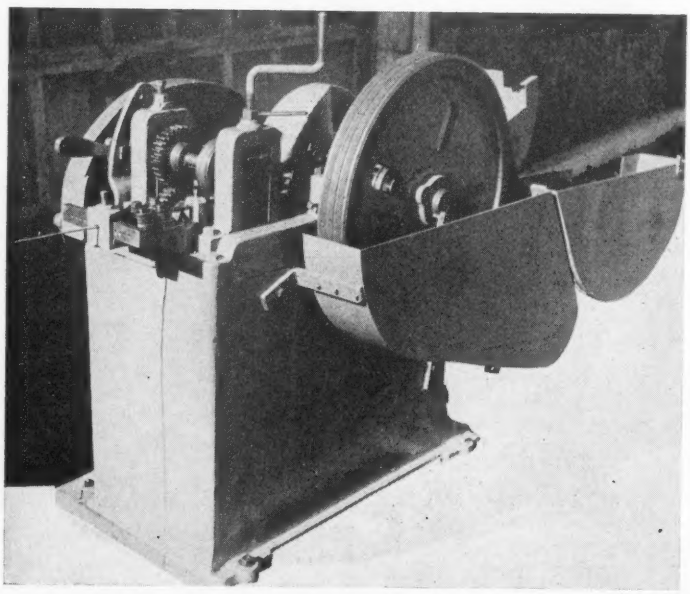
For covering wire conductors, this inventor provides a horizontally-disposed block having a vertically-disposed die opening formed in its central portion, this dle opening having a bell-shaped upper portion. A liquifier for a thermoplastic material is positioned on the top of the block, and there is also provided a device for advancing the conductor downwardly through the die opening.

* * *

No. 2,422,612, METHOD FOR MAKING WIRE DRAWING DIES, patented June 17, 1947 by Noah Borne, Fort Wayne, Ind., assignor to Fort Wayne Wire Die Company, a corporation of Indiana.

This method consists in the emplacement of a refractory die body in a chambered metallic block, insertion into the chamber of the block a metallic investment plug having a peripheral annular recess located between its ends, the top thereof being flush with that of the block, heating the encasement to a plastic state, then forcefully applying a ram against the top of the plug and an encompassing portion of the block, whereby to firmly imbed the die body between the plug and adjacent wall of the block and extrude the wall of the block into the recess to interlock the investment plug and block.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.



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Manufactured Exclusively for:

REED and RICHARDS TRANSATLANTIC, Inc.

CHANIN BLDG., 122 EAST 42nd ST., NEW YORK 17, N. Y., U.S.A.

REG. CABLE ADD.: "LOUREED, NEW YORK".

Also Wire Bale Tie Machines, producing single loop, round or oval ties, 2000 per hour; 3 to 16 ft.

No. 2,422,776, WIRE STRIPPER, patented June 24, 1947 by Walter F. Cunny and Harvey E. King, Jr., Sycamore, Ill., assignors, by mesne assignments, to Ideal Industries, Inc., Sycamore, Ill., a corporation of Delaware.

A pair of spring-urged blades are included, with equalizing means to cause both blades to cut equally deep.

* * *

No. 2,422,827, METHOD OF MAKING GRIDS, patented June 24, 1947 by Donald F. Drieschman, San Carlos, Gordon Shepherd,. Burlingame, Mendel, Rabinawitz San Francisco, Almer M. Newhall, Jr., Palo Alto, and Harold E. Sorg, Redwood City, Calif., assignors to Eitel-McCullough, Inc., San Bruno, Calif., a corporation of California.

This method comprises laying a number of wires longitudinally along a metallic mandrel to form bars for a connected series of grids, axially advancing the mandrel and these laid wires in unison, winding another wire about the mandrel, applying a welding electrode to an intersection of the wires at the point where the wire being wound approaches the mandrel, and passing an electric current thorugh the electrode and mandrel and the interposed wires to weld the latter together.

* * *

No. 2,423,050, WIRE SWIVEL, patented June 24, 1947 by Raymond R. Rundell, Miami, Fla.

This swivel is constructed wholly of wire, formed to provide a pair of eye-forming, overlapping, extension members, with a locking eye carried by one, the members being locked to each other, and accommodating a headed shaft, swivelly engaging in the eye.

* * *

NOTICE TO SUBSCRIBERS

regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK OF THE WIRE ASSOCIATION

The 1947 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of The WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

To all others the price remains as heretofore $5.00 per copy.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in the country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually... Only $3.00 to subscribers.

WIRE and WIRE PRODUCTS

300 MAIN STREET **STAMFORD, CONN.**

Pittsburgh Steel Company Buys Johnson Steel & Wire to Extend Opperations

PITTSBURGH Steel Company has acquired the **Johnson Steel & Wire Company, Inc.,** of Worcester, Mass., a leading manufacturer of high carbon wire for the automobile, rubber tire, textile and musical instrument industries.

* * *

THE Johnson company, has a main plant in Worcester, Mass. and branch plants and warehouses at Akron, Ohio and Los Angeles, California.

* * *

IN announcing the acquisition of the wire manufacturer, Mr. Carter said that the move was part of a carefully planned expansion of his company to extend operations in the finished products field. In this connection, Pittsburgh Steel, which has an annual capacity of more than 1,000,000 tons of steel and is currently operating at capacity, has very little semi-finished steel to sell outside of our own requirements.

* * *

CONSOLIDATION of the two companies, will provide the Johnson company with a steady supply of steel, the lack of which has prevented expansion of that company's sales to their full potential. To Pittsburgh Steel, it will mean another steady outlet for products of its mills.

* * *

JOHNSON Steel & Wire Co., Inc. will continue business under its own name as a wholly owned subsidiary of Pittsburgh Steel Co., with Charles David Johnson as president.

* * *

JOHNSON Steel & Wire Co., Inc. has produced many special types of wire for industry and the government. Prior to the war, the company developed and produced for the Armed Forces a galvanized Signal Corps wire. Another wire was specially developed by the company to hold barrage balloons over London.

ELECTRIC DEVICES IMPROVED BY FORTISAN*

by William Whitehead
Celanese Corporation of America
180 Madison Avenue
New York, N. Y.

The growing use of synthetic yarns in the manufacture of electric wire and cable will make this factual description of the characteristics of one such type of yarn of general interest to those producing products in which it may be utilized.

FEW of the consuming public realize the part played by the Textile Trade in making possible many modern scientific aids to efficiency and comfort of living and think more of textiles in connection with wearing apparel, draperies, and floor coverings, whereas many millions of pounds of textiles annually are incorporated in modern scientific devices used daily or relied upon by the public in its daily activities.

* * *

MORE than any previous war World War II provided a terrific impetus in the invention and development of such devices especially in the fields of electricity. Textiles played a prominent part in these. In these devices, the combat forces, in the air, on land and at sea, demanded previously unheard of precision, lightness and great durability, against the extremes of temperature, weather, accelerated attacks of the elements and nature with widely and rapidly changing conditions. Of much importance in electrical devices, such as radiotelephones, radar, electrically heated flying suits and gloves ,also numerous other devices, is the Tinsel Conductor. This we use daily in picking up a hand-set telephone, the conductor between the base and the hand set being of this type. In telephones, radar devices and the like, the Tinsel Conductor conveys the current with low resistance and insignificant development of heat. In heated clothing, blankets, etc., it offers high electrical resistance with the development of the desired heat. Were these electrical conductors made simply of wire or wire of many strands, they would change in electrical properties and soon break from constant twisting and bending. Prior to World War II, to lengthen the life of these conductors a core of cotton thread was wrapped spirally and precisely with fine strips of metal, for example copper alloy. The cotton resisted strech and provided a core for the spiral conductor which stands up much better to twisting and flexing. The cotton had to be purified chemically to remove, as much as possible, adsorbed salts inherent in the yarn or added during scouring and cleaning, which salts conduct electricity, interfere with the electrical properties and cause corrosion. This purification required great care and many analyses to insure reasonable properties. Cotton was selected from known textiles as resisting stretch and standing up well to heat which is of importance in use and permits hot coating with rubber or plastic insulation. It had disadvantages, however. The cotton fiber is individually strong but cotton yarns develop only a fraction of their fiber strength being built up of many fibers twisted tightly together to make them adhere. The yarns vary somewhat in diameter along their length, it being impos-

* Reg. U. S. Patent Office.

Heat at Work...in CONTINUOUS OPERATIONS

SPEED, CONTROL, and CHANGE OF PACE are all in the windup

• Integrating reels, capstan, power source with hydraulic or electronic controls into one unit, IOI's variable-speed, constant-tension windup machine is unexcelled for smooth, stepless winding of continuous and semi-continuous materials after processing operations. It has everything.

Speed which winds wire and other materials 3 to 5 times faster than previous equipment. Control in handling materials requiring tight wrap or loose wrap with equal facility. Change of pace which continuously regulates the speed of windup reels by automatic synchronization to maintain tension regardless of diameter change.

The basic design, originally developed by IOI for more uniform finishing of cable insulation, is flexible enough to suit a wide variety of applications, with simple variations.

Complete details of IOI installations adaptable to your industry are available in booklet form. Copies will be sent upon request.

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IOI ENGINEERING VERSATILITY
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ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W.1, ENGLAND

sible to make a perfectly uniform yarn. This work demands maximum uniformity. Further, with flexing and stressing in use, the cotton fibers tend to slide apart. Improvements over the cotton yarns were required.

* * *

A man-made fiber, born of World War II, and sold under the registered trade mark "Fortisan", was applied during that war entirely to military purposes including numerous types of parachute, braids, cords, sewing threads, coated fabrics, pilots' anti-blackout suits, and other uses where great strength and lightness were required. Added were much improved Tinsel Conductor core threads of Fortisan, replacing cotton. Fortisan is made by spinning Celanese cellulose acetate yarns of similar Celanese ester yarns, drawing them to much greater fineness under precise scientific conditions so that all the molecules lie parallel along the yarn and are firmly linked, then splitting off the combined acids so that fine filaments of cellulose of high purity remain. This process not only imparts extreme strength, which in engineering terms is 138,000 lbs/sq. inch or more but great resistance to stretch, the Modulus of Elasticity in tension being 4.3 million or more. It also imparts remarkable stability of length under all conditions of wetting and drying, changes by such treatments being insignificant and less than 0.1%. Gossamer-like filaments, much finer than silk, are obtainable by this process for which patents have been granted to the Celanese Corporatin of America.

* * *

FORTISAN lent itself peculiarly to development of much improved Tinsel Conductors on the counts of greater strength, greater uniformity, improved and very uniform electrical qualities, greater flexibility, especially as substantially finer threads could be used because of the greater strength. To these were added the advantages of having continuous filaments instead of many short adhering filaments and the great resistance to stretch. The industry has been quick to continue the war time uses of Fortisan in these Tinsel Conductors not only in military devices but in civilian devices of wide spread use. Electrically heated blankets now employ Fortisan core threads for the Tinsel Conductors employed as the blanket's heating elements. Fortisan supplies the core thread for many hearing aids and here the Plastics' Trade has contributed. The conductor running to the small ear phone comprises two very fine Fortisan-Tinsel Conductors over which is extruded a plastic of transparency and color making the device less conspicuous. This type of assembly with various extruded coatings is employed on many other devices such as electric shavers and calculating machines. Other types of fine flexible conductors employ Fortisan on industrial mechanical devices where fineness and flexibility are of importance. Tinsel Conductors of Fortisan are going to various telephone cords and Fortisan having a very high resistance to heat permits greater latitude in hot extrusion coating of rubber and plastics, for the outer insulation. There are other growing uses of Fortisan in these electrical fields, for example braiding or lapping around fine conductor wires which in themselves have the desired electrical qualities but are not strong enough and re-

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It could never meet the demands of modern commerce. Today's huge, high-speed, coast to coast trailer trucks, exemplify America's general all around progress, since the days of the pioneer. And—so it is with

CHEMICALS ACP PROCESSES

RUST PROOFING AND PAINT BONDING
Granodine *
Duridine *
Alodine *
Lithoform *
Thermoil-Granodine *

RUST REMOVING AND PREVENTING
Deoxidine *
Peraline *

PICKLING ACID INHIBITORS
Rodine *

Rodine*

RODINE is particularly typical of American scientific progress. It saves good metal—prolongs the life of the pickling bath—kills unpleasant and destructive fumes, and assures better control in sulfuric and muriatic acid pickling. Over-pickling and accompanying acid embrittlement are held to a minimum.

There's a type of RODINE for your own pickling job. Your inquiries are welcome.

* Trade Mark Reg. U. S. Pat. Off.

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

quire a fine strong uniform insulation. Fine dyed threads of Fortisan are included in various insulation coverings for identification. The processes of inclusion require strength and fineness without interfering with the properties of the assembly and in numerous cases adding to the strength of the assembly. Fortisan is now being supplied in natural black color. This black yarn contains no dyestuff and is completely fast to all treatments except actual destruction of the yarn by ignition and is similar to the black Celanese yarn that has been made for many years. This black yarn has many uses and offers considerable economy in avoiding windings and dyeing where black identification threads are required in electrical work.

* * *

Various acoustic dampers and diaphragms are made of Fortisan because of its dimensional stability and retention of properties under widely different atmospheric conditions. This dimensional stability has naturally suited Fortisan for scientific instruments and wind cords employed in numerous measuring devices, and in radio and radar, where dial adjustment and other mechanical movement is relayed by fine strong braided cords. Lengthening or shortening under stress, or by atmospheric changes, lowers the efficiency and utility of such equipment.

* * *

FURTHER uses in the electrical fields are still being found for this new man-made fiber which is being applied with great advantage in a wide range of textiles. This range includes corset and brassiere fabrics, two-way stretch or one-way stretch foundation garments and swim suits, ladies' intimate under apparel, dress wear, parachutes, sewing theads, fine woven labels, typewriter ribbons, lace, fishing lines, very light coated rainwear, varnished electrical insulation of fine gauge, balloons, lighter-than-air craft, high pressure hose, and conveyor belting.

SEND IN
YOUR ORDER NOW
for the
1947 WIRE BUYERS GUIDE

American Steel & Wire Planning New Fine Tire Wire Plant

CONSTRUCTION of a $10,000,000 plant for production of steel wire 0.0059 in. in diameter is under consideration by **American Steel & Wire Co.** Developed in the research department at American Works of American Steel & Wire Co., the 0.0059-in. wire was used extensively in heavy-duty tires during the war and proved to be of great value in providing longer life for casings while conserving critical rubber.

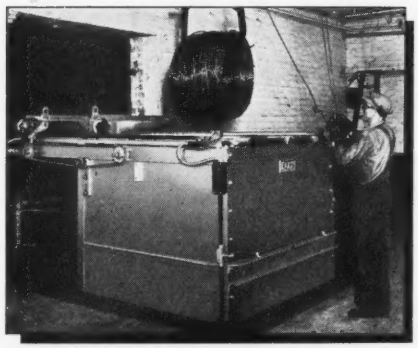
THE wire lends itself to other uses, such as reinforcement for V-belts, power transmission belts and conveyor belts, where strength and endurance must be combined with a high degree of flexibility.

* * *

THREE fine wires are twisted into a strand, and six of these strands are laid around a central core to form a cord 1/32 in. in diameter. A number of cords are then placed parallel to each other and coated with rubber, producing a ply of extreme strength and resistance for use in tire construction.

SPEEDY,
SCALE-FREE
WIRE ANNEALING

★



Unique Ajax Electric Salt Bath Method provides fast, scale-free production—without decarburization. Cuts operating costs—greatly increases pot-life!

★

Added advantages in this modern, proved annealing method are—less floor space required, less labor, low maintenance cost, shorter time cycles (rarely over 20 minutes), no atmosphere equipment, no scaling, no explosion hazard. This modern electric salt bath annealing by the famous immersed electrode internal heating principle is ideal for annealing low carbon, high carbon and stainless steel wire and rod—in gauges from .020" to .250". Or for annealing aluminum, and copper and silver alloys. Also for descaling stainless and alloy steel wires in molten caustic soda. Recently developed salt mixtures greatly lower the cost of these operations. Interesting case-histories are available. Write for list of users.

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THE AJAX HULTGREN ELECTRIC SALT BATH FURNACE

ASSOCIATE COMPANIES:
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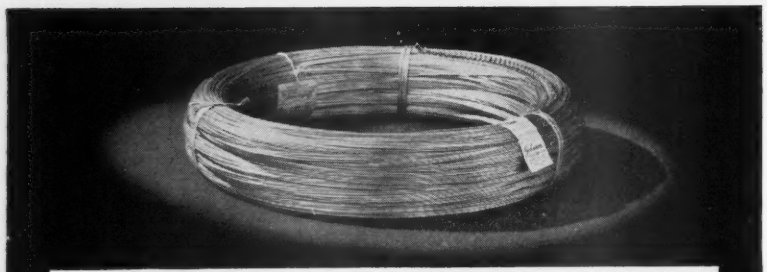
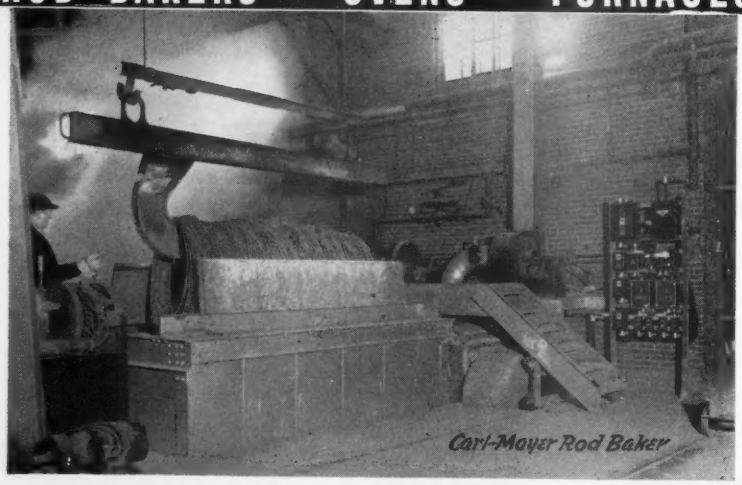


Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
Hard Drawn Spring Wire
Heddle Wire
Hose Reinforcement Wire
Mandolin Wire
Music Wire, bright, tinned or alloy coated
Piano Wire, perfected quality
Rope Wire, bright or galvanized, mild plow, plow, improved plow
Seal Wire • Stainless Steel Wire
Stapling Wire • Stitching Wire
Tire Wire—bronze plated

Your nearest Johnson branch will give you prompt service.

JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

MORE PRODUCTION
with CARL-MAYER HI-SPEED
ROD BAKERS - OVENS - FURNACES



TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — Patented ANY FUEL
WRITE for BULLETIN No. 241
Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
California Wire Cloth Corp.
Eaton Mfg. Co.
Frost Steel & Wire Co. Ltd.
Hollup Corp.
Johnson & Nephew Ltd.
Jones & Laughlin Steel Corp.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada
Wickwire Spencer Steel Div.
Page Steel & Wire Co.

THE CARL-MAYER CORPORATION
3030 EUCLID AVENUE
CLEVELAND, OHIO

LABOR RELATIONS

(*Continued from page* 594)

such as Harry Bridges of the West Coast longshoremen, or with James Matles of UE, there is a door open to them and their union in the AFL. Sentiment for organic unity of the labor movement is particularly strong in left wing CIO unions, and Murray's purge tactics might not only strengthen his enemies by sending them into the AFL but might isolate him with a handful of his right wing leaders outside the AFL.

* * *

AT any rate the "post Taft-Hartley" situation in the UE is worth close attention of manufacturers.

* * *

THE AFL decision on the "no strike pledge" of course leaves the door open to either peace or war. If union leaders and management agree there can be a "gentlemen's agreement" to leave the closed shop alone in return for an unwritten pledge of no strikes. If management wants to fight out the issue and ban the closed shop for a considerable period, indications are that the bigger AFL unions will take up the invitation.

* * *

THE same holds for the big unions which are planning to by-pass the NLRB. If the union bosses and management can work out agreements of their own, the Government bodies can be completely ignored. On the other hand if the unions have become so powerful that to "cut them down to size" management is ready to undergo a period of industrial warfare, it can take the chance now. No better opportunity is likely to present itself unless a major depression comes.

* * *

AT any rate the labor-management picture has become so fluid since passage of the new law that industry leaders here in the national capital are leaning more than ever toward closer co-operation among manufacturers in wire and wire products fields, as a basis for working out a sound labor policy.

New Instrument Purifies, Removes Moisture From Gases Automatically

A new automatic device which removes oxygen impurities and eliminates moisture from gases has been introduced by **Baker and Company, Inc.**, Newark 5, N. J., refiners of precious metals.

* * *

CALLED the Deoxo Puridryer, the instrument was developed and perfected in the company's laboratories here to fulfill the need of many industries for both high purity and moisture-free gases. Previously, in order to accomplish this, it was necessary for trained technicians to follow complex laboratory procedures.

* * *

CAPACITY of Baker's Deoxo Puridryer depends upon the moisture content as well as impurity of the incoming gas, which varies with each installation. Using bottle hydrogen of 99.7 per cent purity, and a maximum flow of 50 c.f.h., pure gas, with dew points better than -50 degrees Fahrenheit for over 36 hours of continuous operation, is attained. This is the equivalent of almost nine bottles of hydrogen.

* * *

THE catalyst used in the purification phase never requires reactivation. It should last indenfinitely, it was stated, unless poisoned by sulphur compounds, carbon monoxide, or some organic solvent vapors, which are rarely found in commercial hydrogen.

* * *

CONSIDERED essential for atmosphere furnace application, Baker's Deoxo Puridryer is also recommended for use in such fields as powder metallurgy, brazing, heat treatment, hydrogenation, vacuum tube manufacturing, and others.

SEND IN
YOUR ORDER NOW
for the
1947 WIRE BUYERS GUIDE

A Modern and Better GALVANIZING FLUX

A LETTER BRINGS A MAN

to tell you about it!

IT has been proved that No. 20 Galvanizing Flux offers results which hot galvanizers have been looking for. Briefly this: more *ductile*, more *adherent* coatings—at *lower operating costs.*

A letter from you will bring full details, or an H-VW-M engineer to explain all the features and advantages of No. 20 in person.

And here's additional good news: When you have the facts and have decided to try No. 20—as we think you will—you can get *prompt shipment* right from stock.

No. 20 Galvanizing Flux is modern, it's better, it's available in a hurry. Get the whole story. Write H-VW-M today.

1433

HANSON-VAN WINKLE-MUNNING CO.
MATAWAN, NEW JERSEY
Manufacturers of a complete line of electroplating and polishing equipment and supplies
Plants: Matawan, New Jersey · Anderson, Indiana
Sales Offices: Anderson · Chicago · Cleveland · Dayton · Detroit · Elkhart
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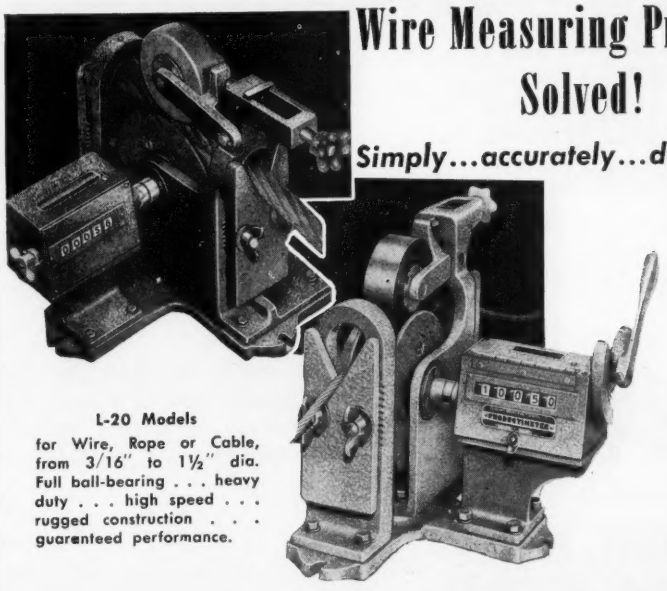
HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY, U.S.A. SINCE 1870



Wire Measuring Problems Solved!

Simply...accurately...dependably

L-20 Models
for Wire, Rope or Cable, from 3/16" to 1½" dia. Full ball-bearing . . . heavy duty . . . high speed . . . rugged construction . . . guaranteed performance.

PRODUCTIMETER Wire Measuring Units offer you many different models to consider as you start tackling the problem of securing reliable count in various wire processing. They're adapted for measuring insulated cable, rope, chain, braid, bare copper cable, rough-surfaced conductor, greasy, oily wire . . . at speeds from 500 to 5000 feet per minute. Recommendations furnished gratis!

Write today for Bulletin No. 3

DURANT MANUFACTURING COMPANY

1918 N. BUFFUM ST.
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ROOS

WIRE DIE FINISHING MACHINERY

A COMPLETE LINE OF WIRE DIE FINISHING MACHINERY FOR THE

DIE ROOM

- ROOS LIGHT DUTY LAPPING MACHINERY
- ROOS HEAVY DUTY LAPPING MACHINERY
- ROOS SEMI-AUTOMATIC POLISHERS
- ROOS AUTOMATIC POLISHERS
- PARK PIN GRINDERS
- ROOS PIN MAKERS
- ROOS PRECISION PIN GRINDER
- ROOS — 10 SPINDLE DRILLER
- ROOS NEEDLE GRINDER
- ROOS BALL BEARING POLISHING HEAD
- ROOS POLISHING LATHE
- SPECIAL MACHINERY FOR SQUARE OR SHAPED DIES

SEND FOR PRICES & CATALOGUE

ROOS TOOL Mfg. Co.

ENGINEERS - DESIGNERS

of

TUNGSTEN CARBIDE FINISHING MACHINERY

49 Bloomfield Ave., Newark, N. J.
Plant and Eng. Dept. 17-19 Grove St.
MONTCLAIR, N. J.
NEWARK SUBURB

NEW — AND BETTER

The *Trauwood* PROCESS

PATENTING
TEMPERING
ANNEALING

OUTSTANDING ADVANTAGES

Higher and more uniform physical and fatigue properties.

No surface decarburization or scale.

Faster wire speeds . . . greater production.

Equipment fully automatic and easy to operate.

Control of heating and cooling cycles extremely accurate.

Thermal efficiency of the process very high.

Much finer grained structure possible.

High quenching temperatures rapidly attained.

Adaptable to high alloy and austenitic steel wire and strip (annealing of stainless).

The Trauwood Process, new in principle, eliminates high temperature furnaces and lead pots with their excessive maintenance costs and low thermal efficiencies. More positive temperature control is possible and quenching is done in a RISING temperature—instead of falling, as in conventional heat treating methods. The rapid rate of heating (4 to 5 times as fast as furnace heating) increases production and uniformly produces a finer grained product with higher physical and fatigue values.

Wire and rod patented by the Trauwood Process insures easier drafting and makes heavier reductions possible. In conjunction with the Trauwood patenting equipment, pickling, coating and baking can be made continuous, eliminating expensive handling and delay, materially reducing costs as compared with ordinary methods.

Complete details of the Trauwood Process will be furnished you on request. Our engineers will help you solve your continuous wire and strip patenting, tempering, and annealing problems. Write today.

THE TRAUWOOD ENGINEERING COMPANY

203 WESTERN RESERVE BLDG., CLEVELAND, OHIO.
British Representative:
JOHN RIGBY & SONS, LTD., LOW MOOR, BRADFORD — YORKS. ENGLAND

Gas Flame Failure Safeguard

COMBUSTION Control Corporation, Cambridge 42, Mass., introduces the latest Fireye flame failure safeguard for industrial gas oven, kiln, and boiler protection. Fireye Electronic Flame Rod Type 45JQ1 brings to the combustion field the most advanced electronic design incorporated in several complete combustion control systems, readily applicable to all types of gas-fired burners.

* * *

FIREYE is a foolproof electronic flame failure safeguard which actually "feels" the gas flame — maintains a constant vigil day and night against danger of flame failure. When flame fails, it instantly cuts off fuel and can be wired to sound an alarm automatically. Unlike thermal controls, Fireye responds to the flame itself, not to a secondary effect of the flame.

* * *

Self-Supporting Aerial Cable

IT is no longer necessary to prune great holes in the foliage of shade trees to permit the stringing of electric lines which are essential to residential areas and industrial plants. Nor is costly excavation to install underground cable the solitary alternative to the open-wire aerial line with its risk of service interruption from wind and ice storms.

* * *

A heavily insulated "self-supporting" type of overhead cable has been developed at the Worcester, Mass., cable works of **American Steel & Wire Company** for this service. The new cable is of simple construction and offers high mechanical and electrical properties for power transmission. Besides insuring safety, the cable is said to be inconspicuous, easy to install and low in cost.

* * *

THE conductors within the cable are individually insulated with rubber of high quality, jacketed with semi-conducting neoprene, which also resists abrasion. One, two or three insulated conductors are then cabled around a steel messenger strand of sufficient strength to support the cable. To provide slack for installation, and for when taps for transformers may be cut into the line, the direction of the cabled conductors around the messenger is reversed every 12 to 20 feet.

* * *

New Folder on Laboratory Instruments

A 2-page chart (R-1066) titled "Basic Characteristics of Useful Industrial Laboratory Instruments" has been announced by **North American Philips Company, Inc.**, 100 East 42nd Street, New York.

* * *

DATA is presented in a conveniente form in order to facilitate hanging on the wall for ready reference.

* * *

SEVEN vertical columns have the following headings: Apparatus or System, Principle, Basic Arrangement, Operation, Application, Comments, and Manufacturers or Suppliers.

* * *

FIFTEEN instruments are covered in the tabulation and include the following: Colorimeter, Cyclograph, Electron Microscope, Geiger-Counter X-ray Spectrometer, Magnaflux, Mass Spectrometer, Photometer, Photelometer, Spectrograph, Spectrophotelometer, Spectrophotometer, X-ray Diffraction, Zyglo, Electron Diffraction and Supersonic A diagram accompanies each case to show the basic arrangement.

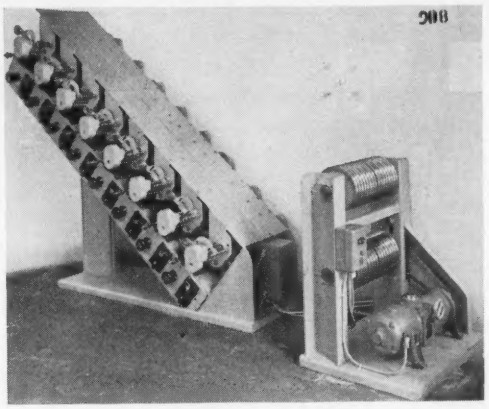
* * *

New Technical Bulletin on Deoxidene

THE **American Chemical Paint Company**, Ambler, Pa., has issed a new Technical Data Sheet, No. 3-1-1-2, describing its product, Deoxidine, a preparation for rust removing and metal cleaning.

MULTIPLE WIRE PROCESSING TAKE-UP No. 908

Each reel spindle individually controlled as follows: —



Ball-bearing Torque motor drive • Wire tension varied thru rheostat • Traverse is uniform as reel fills • Traverse adjustable for rate and width.

Multiple capstan sheaves driven by motorized variable speed transmission. Welded steel construction and ball-bearing thruout. Illustrating one of our new compact 16 unit inclined models.

"American" INSULATING MACHINERY COMPANY

517 West Huntingdon St.
Philadelphia 33,
Pennsylvania, U. S. A.

WIRE SPOOLING MACHINES

The Charles P. Boyd Corporation now manufactures the high quality wire spoolers formerly made by the Fidelity Machine Company

Reasonable deliveries made

Priced right *Write for Catalogue*

CHARLES P. BOYD CORPORATION

202-206 No. Twenty First St. Philadelphia 3, Pa.

REELS **SPOOLS**

ALL SIZES

WOOD -- PLYWOOD -- WOOD-METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Application

DURKEE MFG. CO. **PINE RIVER, MINN.**

THE bulletin tells what the compound does, where to use it, and how to use it. There are several grades of the preparation, each designed for a particular job in industrial production work.

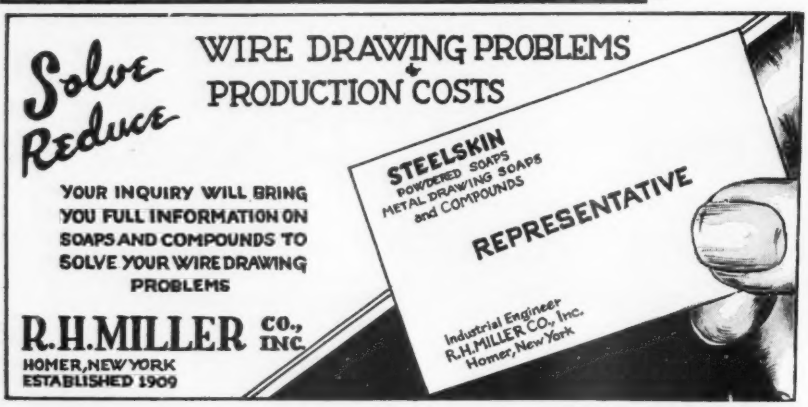
* * *

THE company has also issued a new and up-to-date bulletin, No. P-100-21, which is a list of all their products with brief description of each. Copies of either or both may be secured upon request.

New Supplement to Carboloy Company Tool Catalog Available

A new 16-page supplement (GT-199) to its general Tool Catalog (GT-175R) listing new products, specifications, and price changes, etc., has been issued by and is available from Carboloy Company, Inc., Detroit 32. Designed for insertion in the general tool catalog, the supplement also contains reproductions of several other recent-

WE BUY WE SELL
We Pay Highest Prices for Used Machinery
WE OFFER
2 Light Intermediate Syncro 16-Die Wire Drawing Machines with Take-ups Complete
25 Assorted Take-Up Stands — Large Type
2 New England Butt #N15A Twinning Machines
1 Artos Cutting & Stripping Machine C.S.6E — New
All Machines Reconditioned in Our Own Shop
STOP
LOOK
WIRE & TEXTILE MACHINERY INC.
P. O. BOX 104, PAWTUCKET, R. I.



ly issued supplements to the General Tool Catalog.

* * *

THE previously issued supplements to the Carboloy Tool Catalog which are included in Supplement GT-199 are those dealing with standard carbide threading tools; Carboloy masonry drills; and standard tools, standard blanks, and Carboloy tipped centers.

* * *

New Grinding Wheel Booklet

A revised handbook and catalog on grinding wheels for foundries, steel mills, forge and welding shops has been published by the **Norton Company**, Worcester 6, Mass.

* * *

IT is a book of 32 pages of information on various types of wheels listing kinds of machines on which they can be used, operating data and prices. Copies may be obtained by addressing the Norton Company on your letterhead.

* * *

New Banner Catalog Issued

A pictorial booklet showing their complete line of welders and brazers has just been issued by **Banner Products Co.**, 4947 N. 29th St., Milwaukee 9, Wis. Included in the booklet are illustrations covering air and foot operated spot and butt welders, brazers, portable gun and portable brazer. Range of sizes covers from 1 to 50 KVA. Copies sent on request.

* * *

New Developments in Tungsten Carbide

(*Continued from page* 593)

a result of using steel hammers which wash-cut in the region corresponding to the pinched edge of the wire after the pointing operation.

* * *

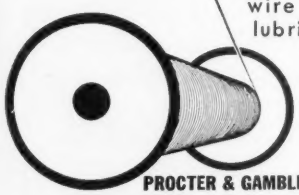
IN the field of bar drawing, solid tungsten carbide side and end

FOR MAXIMUM "MILEAGE" AND FINISH CONTROL IN YOUR WIRE DRAWING OPERATIONS USE P&G SOAPS

For drawing both ferrous and alloy wires—in either dry or wet operations — you can depend upon these important qualities in Procter & Gamble soaps:

Excellent Adherence
Efficient Lubrication
Minimum Dusting
Uniformity
Economy

One of our representatives will be glad to discuss wire drawing lubricants with you.



PROCTER & GAMBLE, CINCINNATI

SPOOLS... REELS... BOBBINS

● IF IT CAN be wound on a reel, spool or bobbin, Apco Mossberg can fill your needs.

For over 50 years we have specialized in the manufacture of spools and reels of all kinds. Our plant is equipped to manufacture almost any conceivable kind, type and size of steel spool, reel and bobbin, in large quantities or small.

Write for our brochure containing useful information on a wide variety of our spool and reel products.

APCO MOSSBERG CO.
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Canadian Representatives:
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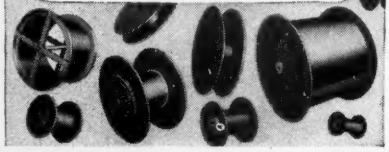
47 Colborne St., Toronto.
Ontario, Canada



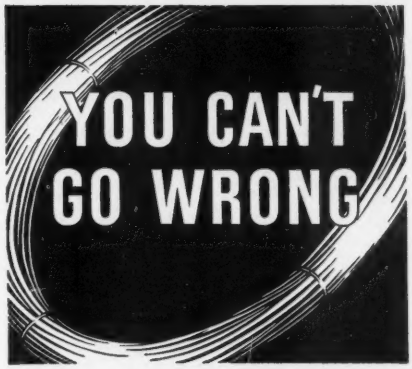
blocks or adjustable dies have been used considerably and are found to be equally as good as the type involving the mounting of a carbide insert in a steel shank. The precautions to observe outside of directly striking the blocks with a hammer are (1) provide flat ground back-up and filler blocks and wedges for full support of the carbide and (2) eliminate bending loads on the portion of the side block overhanging the end blocks when narrow widths of stock are being drawn by using back-up blocks of length equal to or only slightly shorter than the distance between the outer faces of the end blocks.

* * *

TUNGSTEN carbide rolls both for edging sheet and for flattening wire are a highly practicable application. In the larger sizes, such rolls consist of a tungsten carbide ring fitted to a steel hub. In the smaller sizes, the roll may be entirely carbide. Feed rolls for spring forming machines are now a more or less common application. In the case of wire flattening rolls and feed rolls, the life of the rolls is extremely great which means considerable savings in downtime by not having to frequently adjust the rolls as is the case with steel rolls. In the case of flattening rolls, the surface finish produced on the wire is considerably better than that produced on steel rolls as the latter begin to wear shortly after being put into operation.

* * *

IN the field of cold-heading, tungsten carbide cut-off knives and quills have been demonstrated to be practicable on wire up to 5/8" diameter and on the larges sizes experimental work is being conducted to determine the practicability. Tungsten carbide heading punches for cold-headers are also a practicable application. A tungsten carbide heading punch with an indented letter in the heading face produced 50,000,000 5/16" cap screws without repolishing before it was finally cracked. This production was obtained continuously over a period of 18 months. The head of the bolt had a nicely burnished finish which was obtained throughout the life of the punch.



No matter what you make—if there's low carbon wire in it, you can't go wrong if you use Wickwire Cortland wire.

Back of every foot of this wire is over 70 years of wire-making experience. There's a size and style for every purpose.

WICKWIRE BROTHERS, INC.
CORTLAND, N. Y.

Cortland BRANDS

STOP Slipping Accidents!

OILY, greasy areas on floors endanger your employees. One effective way to eliminate this hazard is to spread Oakite Composition No. 71 over areas to be de-perilized. This highly absorbent, granulated material quickly soaks up slip-promoting oil, grease and water. Gives your employees sure footing for more efficient production. "71" is economical, too.

FURTHER DETAILS GLADLY MAILED ON REQUEST

OAKITE PRODUCTS, INC.
52A Thames Street, NEW YORK 6, N. Y.
Technical Representatives in Principal Cities of U. S. & Canada

OAKITE
REG. U.S. PAT. OFF.

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Before-Liming Treatment Increases Wire Tonnage

WHEN used as an undercoat before liming the Oakite CrysCoat treatment for wire drawing promotes adsorption and retention of die lubricants. The improved lubrication that results eliminates frequent changing of dies to increase production. The Oakite CrysCoat Process prolongs die life up to 300%. Rust-retarding, the Oakite CrysCoat Process cuts down costly recleaning and recoating time.

Your nearby Oakite Technical Service Representative will gladly test-run Oakite CrysCoat in your plant. Consult him today. Send for FREE Service Report.

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Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Warner

BELL-MINE
LIME
for
WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
BELLEFONTE, PA.

Sales Office
Philadelphia — Pittsburgh — New York

Recently, connecting rod bolts with flats formed on two sides on the head by means of a suitable groove in the tungsten carbide heading die have been successfully made. Tungsten carbide heading dies, as is commonly known now, are widely used for not only straight hole heading but also heading in combination with either extrusion or pointing.

* * *

A fairly recent development that has resulted in successful application during the last four years is that of substituting tungsten carbide for steel rolls and plates in clutches for cold-headers and other machines using an interrupted feed. Only infrequent redressing of the plates is required and by means of simple mechanical means of holding, the plates can be shimmed out with each redressing with the result that the life of a set runs into years of constant usage.

* * *

THE field of development of applications for tungsten carbide is obviously very great. Considerable development work is in process but it is still too early for discussion. Other new applications will come to light at the instigation of the user with whom we will gladly cooperate in recommending materials and construction, supplying the tungsten carbide dies, and providing whatever assistance might be desired in seeing the development to a conclusion.

* * *

Wright Wire Company
The Germ of Wickwire-Spencer

(*Continued from page* 590)

Club, a salesman of the most colossal assurance and iron nerve. He conceived a gigantic merger of all wire interests in the district, hounded the reluctant owners until they gave him options at grossly inflated figures merely to get rid of him, and in the end actually effected the merger and launched the **Wickwire-Spencer Steeel Corp.**

ACID AND ALKALI PROOF
LININGS AND MORTARS

•

ACID PROOF
CONSTRUCTION

•

THE CEILCOTE CO.
Consulting and Research Engineers
750 ROCKEFELLER BLDG.
CLEVELAND, OHIO

WIRE CUTTING MADE EASY

Hard wire*, spring wire, as well as soft wire, wire fabric, tie wire, fencing, etc. — easily and quickly cut with a porter tool. A standard model for average needs. Special models for special work.

Send for catalog showing all Porter models of wire cutters, bolt clippers, etc.

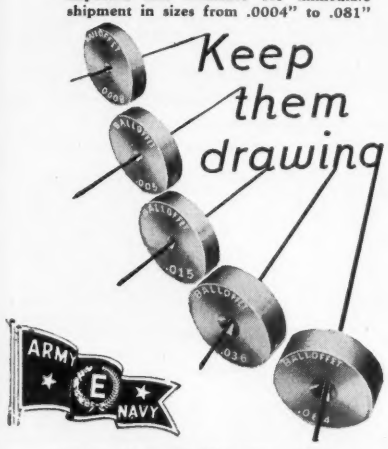
*(with center cut round edge jaws)

H. K. PORTER, INC.
74 FOLEY STREET
SOMERVILLE 43, MASS.

PORTER HKP CUTTERS

Balloffet
DIAMOND DIES

Large stock on hand of domestic and imported dies available for immediate shipment in sizes from .0004" to .081"



Quality Diamond Dies since 1870

BALLOFFET
DIES AND NOZZLE CO., INC.
68-25 Adams at 68th Street
Guttenberg, New Jersey
Union 3-3155

VIANNEY
Famous Wire Drawing Diamond Dies

These famous Diamond Dies are now produced here at moderate prices.

All sizes are in stock or made to order to your specifications

VIANNEY WIRE DIE WORKS
250 E. 43rd. St., New York
V. J. Boulin, Manager

IT is no part of my plan to discuss the merger at this time, although I may get to it after the individual plants have been dealt with. It did not put an end to the Wright saga, it merely caused a hiatus of a couple of years.

* * *

THE year 1920 found the Wright plants submerged in the new corporation with not even a name in the title. The Clinton-Wright Co. had yielded to Wickwire-Spencer before the ink was dry on the letter-heads. George M. Wright, chairman of the first phase, had given way first to **Harry Goddard,** and Goddard to a Wickwire, but the family name persisted in the person of George F. Wright, Vice President and Manager. This sonorous title meant, in effect, that George was a member of an "operating committee," which divided between half a dozen harried executives the burdens which were too heavy for any one man. Just for fun, let's review the membership; perhaps an old-timer, reading the list, can recapture some of the thrills of that period. Chairman and general superintendent, **John Wheeldon.** He deserves an article all by himself. Engineering, **Gus Merk.** Personnel matters, Win Hall, a wire man of the third generation on both sides. Raw materials, **George Endicott.** Practice, **Dwight Granger.** Production, **George Wright.** All gone now. Dwight Granger, the only one to ride out the storm, retired last January.

* * *

IN the preparation of articles like this there is one matter which the historian must approach with the utmost delicacy, namely, the precise circumstances under which the employer-employee relationship was terminated. Sometimes the Veil of Charity must be draped over the parting, the whole episode being so delicately slurred over that neither party can take offence. Probably none of my readers has escaped the experience. The minor executive strides into the front office whistling merrily, and two minutes later, somewhat dazed, he is brushing the dust of the gutter off his jacket

EASTERN DIES

ROUGH CORED NIBS

Semi-Finished and Finished Dies.
Die Repairing and Recutting.
Cold Heading, Extrusion, Tubing and Shaped Dies.

Mandrels and Wear Resisting Parts.

Filament Mandrel Guides for Forming Lamp Filaments.

Finest quality precision work on all tungsten carbide forms and shapes.

Address inquiries to

EASTERN TUNGSTEN CARBIDE CO.
40 EAST BIGELOW ST.,
NEWARK 5, N. J.

BORAX
for
Wire Drawing

After pickling, BORAX can be applied with one dip; dries in three minutes in an oven temperature of 150° F. to provide a coating that will not check or flake off in storage. Dissolves readily in water and is dust free. BORAX, other than being an excellent vehicle for picking up the drawing lubricant, is rust inhibiting and a natural flux that will facilitate the making of good butt welds. Use BORAX to make better wire at less cost. Used in many mills.

Send for complete particulars

PACIFIC COAST BORAX CO.
51 Madison Ave., New York 10, N.Y.

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL
AJAX
SUPPLIES INC.
R.R. 4, P.O. Box 66, Fort Wayne Ind.

NEW ENGLAND WIRE DIE CO.
7 Forsberg St., Worcester, Mass.
EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
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WIRE DIE CORPORATION
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and cursing softly. Instinctively, automatically, he begins to rationalize the affair; his self-respect demands it. He reviews the bitter things he should have said to the old crab while he had the chance, the brilliant repartee that would have left the boss cowering in his big chair, but which unfortunately he didn't think of quite soon enough. Presently he sees that the thing was predestined, and should have been initiated by himself, in fact would have been if the old crab hadn't taken a mean advantage. In a few days his ego has conjured up a story that bears such resemblance to the original as is purely coincidental; in a month he believes it himself.

* * *

WHEN I started a circuituous approach to the matter with George Wright I found I had wasted my time. He volunteered, cold turkey, and I thought at the time with a ring of pride in his voice, that he was the first executive to be fired from the corporation. It was in January 1920 that they passed him the black spot. He thought the matter over a few days and then called in **Albert Knapp**, a brilliant engineer who had been assosciated with the Wrights since he got out of school. Next day they were straddling a drafting board; five months later they started production of wire fabrics on their own loom in the buildings of the old Plunger Elevator Co. on Stafford St. The incorporation was under the name **G. F. Wright Steel & Wire Co.**, and thereby hangs a tale. George's father had agreed not to engage in that line of work, and the lawyers of Wickwire-Spencer maintained that George could not use the name Wright, but George's lawyer told him to add his initials; no man can be prevented from using his own individual name.

* * *

GEORGE made a contract with the A.S.&W. Co. for wire, a very good one for the circumstances, and one which was giving him a comfortable margin, but after some months some combination of conditions began to affect deliveries; in fact, to make a complicated story

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simple, he had to shut down some looms, and the future looked dark. The action he took to relieve the situation makes a good story, and one that is very amusing to those who knew old **Frank Baackes,** but it is not going to be told here. I bring in the subject only to explain why the drafting table was dusted off again and why nine months later, sometime in 1922, the mill was running on its own wire.

* * *

OF the present wire mill much might be said, but will not be. Designing and building their own equipment is an old Wright custom; in this case no wire is sold, it all goes into woven products on the spot, and corners can be cut in the dizziest conceivable way. Wire machines and looms are designed to serve each other. All wire is finished on spools and annealed on spools, and the spools then become a part of the loom. There is practically no process annealing, and no striping, tying up, or transporting of process wire. No more can be said about the practice, certainly not while sundry patents are pending. As a matter of fact, a closer account would simply drive competitors crazy and do them no good; to take advantage of it they would have to set fire to their existing plants, and then kidnap George F. Wright and Albert Knapp.

* * *

THE Wright mills have always had a colorful group of personnel. Much of the following dope comes from **Jack Sullivan,** now at Jessop Steel in Washington, Pa., whose wanderings among the wire mills of the country make Ulysses look like a paralytic in a wheel-chair. Jack broke in with Wright in 1903. In the old-timers photo he is one of the two little micks in the front row, third from the left; the other is his brother Bill, who has just brought him his dinner bucket. **John Ahearn,** next to the right end, is still in Palmer, with **Rathbone. Fred Disley,** just above him, is a foreman in that same mill where he started, and next to him on the end is **Bill Marley,** who went to Youngstown, then to Muncie, and

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to Fostoria where he succeeded another Worcester boy, **Jack McGovern.** Jack drew wire at both Wright plants and at Cortland. **George Tracy,** third in the back row, is now at Worcester Wire Works.

* * *

JACK started in Palmer as errand boy, but spent most of his time hanging around the fine wire frames and starting blocks. He was repeatedly chased off, but didn't quit till the inevitable happened he got pulled around a block and broke his hand. That stopped him while he was in the doctor's hands, but soon he was at it again, and they finally had to give him a fifteen frame to keep him quiet. I think he was fourteen years old. Cleaning was a sketchy process in those days, says Jack, and the wiredrawer had to rely on his wits. There was a little place of resort in Palmer called the Mouse Hole, and according to Jack there was more wire drawn there between Saturday noon and closing time than was drawn in the mill all week, and all liquor-finished, too.

* * *

WHILE I am on Jack Sullivan I will follow him around a bit. In 1906 he went back to Worcester and worked at Hammond St. and a couple of years later went to North Works. Then he did a stretch at Spencer Wire, then, in 1912, back to Hammond St. to set dies for a newly developed continuous machine for weaving wire. He went to Palmer to introduce these machines, and in 1914 went to Clinton and started **Clinton Wire Cloth Co.** in the wire business. After a brief interlude at Morristown, (Electrical Alloy) U. S. Army, and Conroy Motors, he joined Wickwire-Spencer at Goddard Works in Worcester, then went to their Buffalo plant as foreman of fine wire. Next came four years at Ellwood City as Superintendent of American Steel, where he met the girl who is now Mrs. Sullivan.

* * *

AMERICAN Steel sold out in 1926; the machinery went down to **Black Steel & Wire Co.** in Galveston, and the buildings were taken over by the Stronach Nail Co., for whom Jack superintended

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operations till they closed down in 1930. From 1930 to 1938 Jack was assistant to **Henry Haarbauer** at Townsends. He spent a year at Atlas Steels, Welland, and having got a taste of stainless and high speed work he followed on with it at Universal-Cyclops, at Braeburn, at Copperweld, and at Jessop. It speaks volumes for the tenacity of wire drawers that beside Fred Disley, mentioned above, Thomas McGrath and Walter Boris are still Wright Wire men, though the Wright is of another generation. So is George Cunningham, who was gauger and weigher at Hammond Street, assistant to Purchasing Agent Lorion, and is now Purchasing Agent for George F. Wright. Andrew Rathbone, once a rope machine operator, is still in Palmer, but in his own plant, A.B.&J. Rathbone. Peter Swanstrom has just retired. Jim Barber hasn't, and doesn't intend to, and if he sees this and thinks I am bracketing him with Swanstrom in age groups he will kill me. Albert and Edwin Knapp are still Wright men.

* * *

I propose a slogan: WORK FOR WRIGHT AND LIVE FOREVER. By way of support for my suggestion, and to close this account, I append a list of men other than those mentioned already, who have put in twenty years or more for George F. Wright, and were associated before that with earlier Wright interests.

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Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds, Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery Inc., Pawtucket, R.I.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago. Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Champion Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Van Itallie Co., The, New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside. N. J.

DIAMOND POWDERS—
Champion Diamond Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Van Itallie Co., The, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Lead Extrusion
Eastern Tungsten Carbide Co., Newark, N. J.
Robertson, John, Co., Brooklyn, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
New Eng. Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc. Guttenburg N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Millbury Die Co., Millbury, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenburg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport. Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Millbury Die Co., Millbury, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Tungsten Alloy Mfg. Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engineering Co., The, Cleveland Ohio.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING & PRE-HEATING ROOMS—
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O. Engr. Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass
Syer, C. Raymond, Westport, Conn.

EQUIPMENT—Insulation Testing
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engrs. Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.
Wilson, Lee Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING EQUIPMENT
Hanson, Van Winkle Munning Co., Matawan, N. J.

GALVANIZING KETTLES
National Annealing Box Co., Washington, Pa.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of Cleveland.
Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
General Electric Co., Schenectady, N. Y.
Owens-Corning Fiberglas Corp., Toledo, Ohio.
Perfect Thread Co., Inc., Brooklyn, N. Y.
Standard Varnish Wks., Staten Island, N. Y.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LIME—
Warner & Co., Philadelphia & Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bale Tie
Reed and Richards Transatlantic, Inc., New York, N. Y.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
National Machy. Exch. (Used), New York, N.Y.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Mach'y Co., Phila, Pa.
National Machy. Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila, Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch., (Used), New York, N.Y.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co. Montclair, N.J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, O.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
National Erie Corp., Erie, Pa.
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Fence
Glader, Wm. Machine Works, Chicago, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N. Y.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Reed and Richards Transatlantic Inc., New York, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co, Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila, Pa.
National Erie Corp., Erie, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of the Cleveland.
Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm. Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

WHERE TO BUY, Continued

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
National Machy. Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber for Insulating Wire
Royle, John & Sons, Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila, Pa.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
National Erie Corp., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Boyd, Charles P., Corp., Philadelphia, Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N .J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machinery Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Reed and Richards Transatlantic, Inc., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Stranding
Huhgesville Machine & Tool Co., Hughesville, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Ruesch, H. J., Machine Co., Newark, N. J.
Steel Equipment Co., Cleveland, Ohio.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Swaging
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N .J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N .J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I
Wire & Textile Machinery Inc., Pawtucket, R.I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila, Pa.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
National Erie Corp., Erie, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila, Pa.
Eisler Engineering Co., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J .

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Torrington Mfg. Co., Torrington, Conn.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O. Engr. Corp., N. Y., N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio.

POTS—Lead Melting
National Annealing Box Co, Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co,. Phila, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach., Co., Trenton, N.J.
Sleeper & Hartley, Inc, Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REELS—Annealing and Stranding
Howsam Spool Co., Aurora, Ill.

REEL AND TENSION STAND—
Industrial Ovens, Inc., Cleveland, Ohio.
Sleeper & Hartley, Inc, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Apco Mossberg Co., Attleboro Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Bridge Manufacturing Co., Hazardville, Conn.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WHERE TO BUY, Continued

Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R.I.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Bridge, Manufacturing Co., Hazardville, Conn.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div. Republic Steel Corp., Niles, Ohio.

REELS—Wooden
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O. Engr. Corp., New York, N. Y.

RODS—Nickel Alloy
International Nickel Co., Inc., New York, N. Y.

RODS—Stainless Steel
American Rolling Mill Co., The, Middletown, Ohio.
Rustless Iron & Steel Div., American Rolling Mill Co., The, Baltimore, Md.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

SATURATION SYSTEMS
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Procter & Gamble, Cincinnati, O.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company,. Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward, R. B. Co., Chicago, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPRINGS—Tools for Forming
State Machine Tool Co., Hartford, Conn.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.

TANK—Compound
Haveg Corporation, Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corporation, Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TOOLS—Spring Forming
State Machine Tool Co., Hartford, Conn.

TOOLS—Wire Cutting
Porter H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe. O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

STEARATES—For Wire Drawing
American Cyanamid Co., Industrial Chemicals Div., New York, N. Y.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

TREADS—Safety
Norton Co, Worcester, Mass.

TUBE BENDERS AND FORMERS—
Ruesch, H. J. Machine Co., Newark, N. J.

VALVES & FITTINGS—Acid Resistant
Haveg Corporation, Newark, Del.

VARNISHES—For Insulation
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Phila, Pa.
Entwistle, James L. Co., Pawtucket. R. I.
Industrial Ovens, Inc., Cleveland, O.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery Inc., Pawtucket, R.I.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa
Malin & Co., Cleveland, Ohio.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland-Chicago-New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Enameled for Coils
North American Philips Corp., New York, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland-Chicago-New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Wickwire Bros., Cortland, N. Y.
Wickwire-Spencer Steel Div., Colorado Fuel & Iron Corp., Buffalo, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
Ecca Machine Corp., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.

WIRE—Nickel & Nickel Alloy
International Nickel Co., Inc., New York, N.Y.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specification for Special Purposes
Anchor Wire Corp., Jamaica, N. Y.
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland-Chicago-New York.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
W. S. Steel Export Co., New York, N. Y.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's John A., Sons Co., Trenton, N. J.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARNS & TAPES
General Electric Co., Schenectady, N. Y.
Owens-Corning Fiberglas Corp., Toledo, Ohio
Perfect Thread Co., Inc., Brooklyn, N. Y.

YARN TESTERS—
Scott Testers, Inc., Providence. R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

Wire & Wire Products

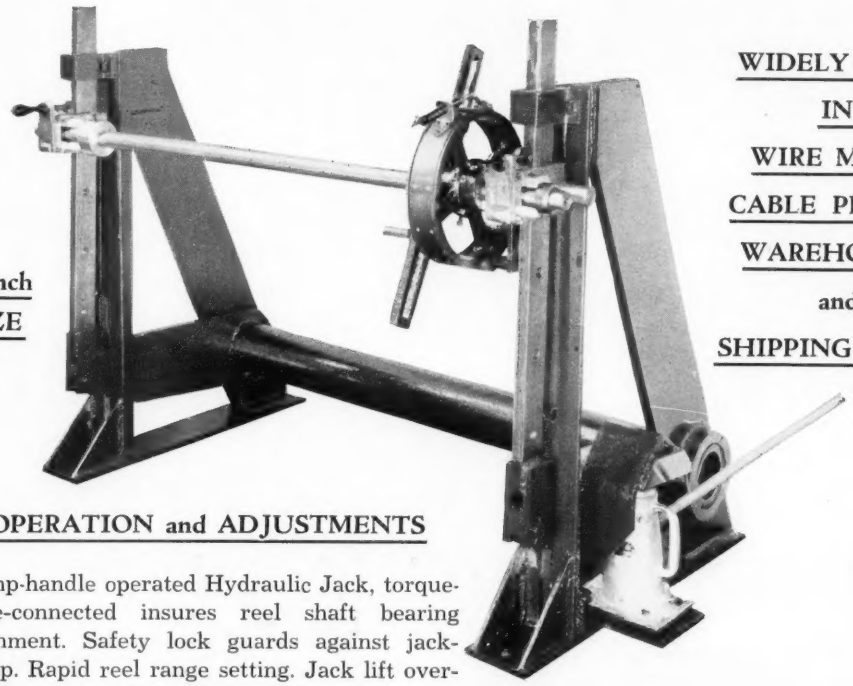
August, 1947

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

Heavy Duty LET-OFFS — Type "H"

The outstanding advantage of this very simple and sturdy design is the ease with which **ONE MAN** can perform all operations and manipulate the heaviest, fully loaded, wire rope and cable reels.

60-Inch SIZE



WIDELY USED IN WIRE MILLS CABLE PLANTS WAREHOUSES and SHIPPING ROOMS

No. W-1495

OPERATION and ADJUSTMENTS

Pump-handle operated Hydraulic Jack, torque-tube-connected insures reel shaft bearing alignment. Safety lock guards against jack-creep. Rapid reel range setting. Jack lift overlaps ranges. Adjustable reel dog allows for wide dog-hole placement variations. Adapters furnished for reel arbor hole variations. Controlled reel lowering by valve adjustment. Standard Brake Friction in fixed position (non-rotating) allows tension adjustment during run-off operation.

THE FOLLOWING UNITS ARE AVAILABLE:

SIZE (Max. Reel O.D.)	MAX. LOAD CAPACITY	MIN. FLOOR PICK-UP
48-INCH	3-TON	16-INCH REEL
60- "	5- "	24- " "
84- "	5- "	24- " "
96- "	10- "	30- " "
110- "	20- "	42- " "

* * *

Request machine Bul. 123138. — Hand Lever Lift and Motorized Mechanical Lift "Shaftless" units are also available.

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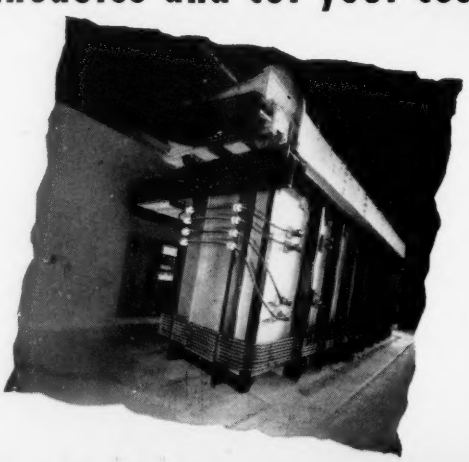
will maintain your production schedules and cut your costs



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Investigate the EF line—recognized for 30 years for efficiency and economy in annealing and other heat treatment of ferrous and non-ferrous wire, whether in coils, on reels, or on spools,—and get the advantage of the many exclusive EF features that assure uniform temperature throughout the furnace, more accurate heat control within the required limits, reduced maintenance, increased outputs, and uniform low cost, dependable operation.

THE ELECTRIC FURNACE CO.

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GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

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